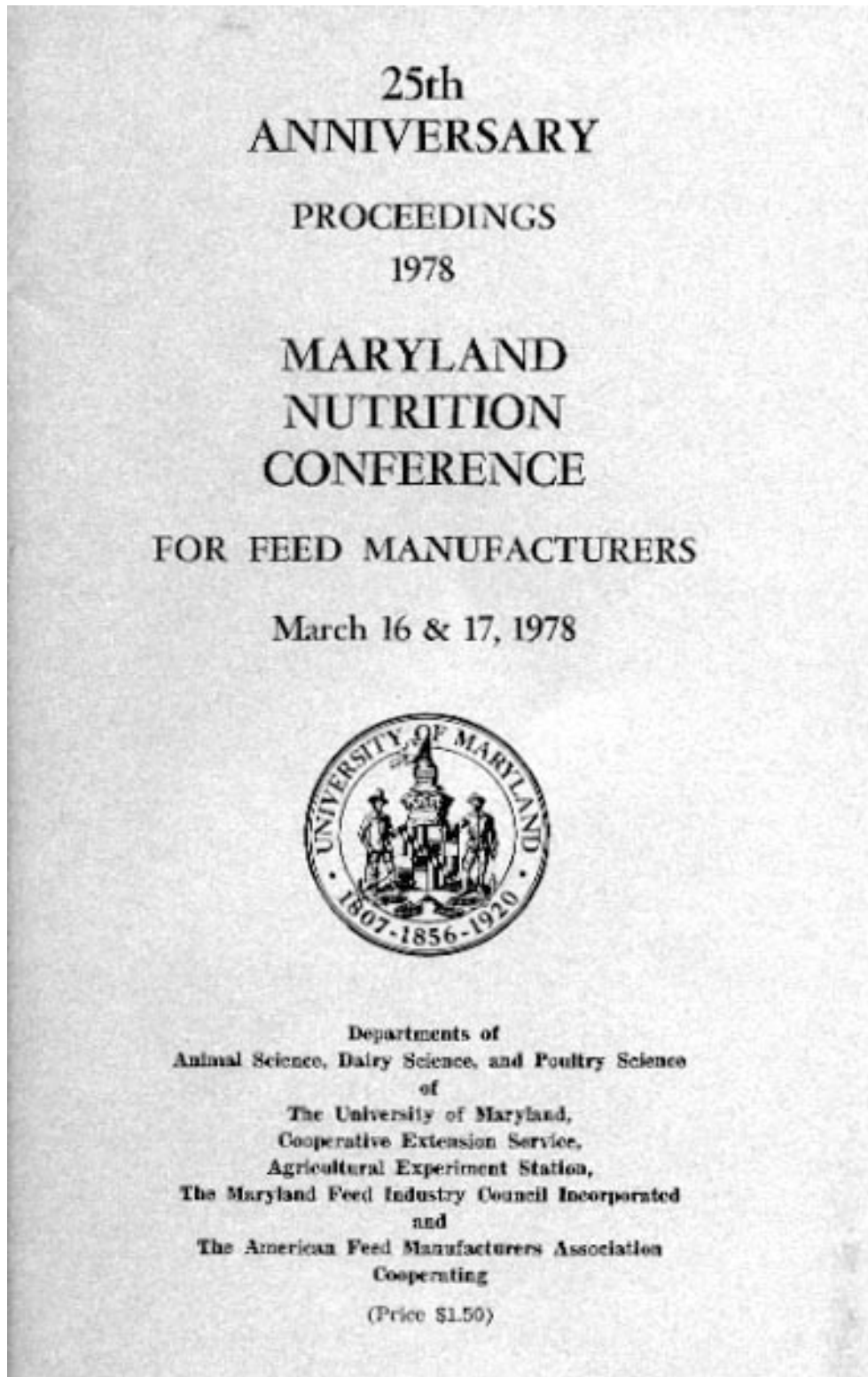


Cover from the 25th Anniversary Edition
(Black print on shiny silver paper)

Read G. Lynn Romoser's Synopsis of the First 25 Years below



NUTRITION AND THE MARYLAND CONFERENCE: 25 YEARS IN PERSPECTIVE

G. Lynn Romoser
Monsanto Company
St. Louis, Missouri 63166

Nostalgia is defined as the longing for things, persons, or situations not present. Such a mental state might lead one into languishing over things past, and prevent participation in happenings of the present. Most important, however, one would be unable to think of, much less, contribute to, those things which are yet to come! On the other hand, temporary lapses into nostalgia can serve as a brief respite in this hustle-bustle world. The preparation of this manuscript has afforded me a brief opportunity to "long for the things, persons and situations" that are no longer present. It was a pleasant and rewarding experience.

Reminiscences are most often of interest only to those who have lived in the past. I am sure many of you remember quite vividly some of the people, things and situations relative to the past Maryland Nutrition Conferences and may even "long" for them. In all probability, there are some which may be best forgotten!

It will be difficult to keep on a futuristic plane because of the nature of the subject, but, if I may be allowed to delve into the past, I'll try bring back into focus those "things, persons, and situations" that made it all come about.

How Did It All Start?

While there may be other versions of the origin of The Conference, in my recollection, it began this way.

It is sometime late in 1952 or early 1953. Jerry Combs and I were in his office planning an experiment relating to my Ph.D. dissertation, which I was trying to complete in time for Graduation, June 1953. We were suddenly confronted by a bright-eyed young man carrying an enormous leather satchel. It was crammed with literature of all descriptions relating to a product, later ascertained to be a protein concentrate. He walked to the desk, stood between us, put his hands on his hips and excitedly asked, "What do you guys know about acids?" We immediately recognized the gentleman as a candidate for a brief course in chemistry which we were pleased to review for him.

The mention of many "acids", such as acetic, nitric, hydrochloric, sulfuric and a host of others--both organic and inorganic--did not "ring the bell", and both Jerry and I flunked the quiz. After we "gave up" and were told it was those acids which were in meat, milk and other proteins, we know that the acids in question were none other than amino acids.

Amino acids were not new even back then, but their application in poultry feeds and the term "amino acid balance" were just beginning to be recognized. It was still a long way from becoming a "household" word in nutrition.

Jerry had previously suggested that a school for feed product representatives would help serve the industry and prevent embarrassment in some cases. After the brief course in amino acid nutrition by our visitor, which, by the way, had many rough edges, we gave the subject further thought. Jerry reasoned that since we were expanding our program in practical feed formulation involving the "acids", it would be desirable to expand the teaching idea. He proposed the inclusion of not only produce representatives (who since 1952, have developed a high level of sophistication) but feed manufacturers, service men, university personnel and any other persons interested in the field of Poultry Nutrition. It would serve as forum to accelerate the adoption of practical research results by feed manufacturers. Also, it would interpret in a practical way research results which would be most beneficial in producing poultry meat at a reasonable profit and at a price attractive to the consumer. Statements composed 25 years ago relating to the purpose of the Conference are still valid and perhaps were used verbatim in the program for this meeting.

With the permission of Dr. Morley A Jull (Mr. Poultry), the best boss a man could ever have, Dr. Combs immediately began preparation for the first Maryland Poultry Nutrition Conference, held in the University of Maryland Central Auditorium on March 6, 1953!

The First Conference

Twenty-four Conferences have been completed. This one makes it the Silver Anniversary. It is impossible to bring to mind all, or mention in any detail any except the first one. For posterity, I think the first program should be included in these Proceedings.

Major duties relegated to this author were to contact the guest speakers, help edit the manuscripts, put the Proceedings together (with a staple gun) and arrange for the physical facilities. The latter, by the way was no easy chore!

FIRST PROGRAM OF THE
MARYLAND POULTRY NUTRITION CONFERENCE
University of Maryland, College Park
March 6, 1953

Morning Session
Dr. M. A. Jull, Chairman
Poultry Department, University of Maryland

- 9:15 a.m. - Registration, Agricultural Auditorium
- 9:30 a.m. - Welcome, Dr. M. A. Jull, Head of Poultry Department
- 9:40 a.m. - Recent Broiler Nutrition Research - Dr. G. F. Combs,
Professor, Poultry Nutrition

- 10:30 a.m. - Report of Broiler Trials, Maryland Substation
- Breed and Strain Comparisons - Dr. C. S. Shaffner,
Professor, Poultry Physiology
- Floor Space Requirements - Professor P. F. Twining,
Extension Poultry man
- Respiratory Disease - Dr. I. M. Moulthrop, Maryland
Livestock Sanitary Service

11:40 a.m. Discussion

12:15 p.m. Luncheon, University Dining Hall, Speaker,
Dr. G. M. Cairns, Dean, College of Agriculture

Afternoon Session
Mr. M. W. Chichester, Chairman
Dietrich & Gambrill, Inc., Frederick

- 1:30 p.m. Quality Control in Purchasing Feed Ingredients -
Dr. C. D. Caskey, Cooperative Mills, Inc., Baltimore
- 2:00 p.m. Broiler Mash Formulation - Dr. G. F. Combs, Professor, Poultry Nutrition
- 2:40 p.m. Discussion
- 3:00 p.m. Question period
- 3:20 p.m. Tour of Poultry Research Laboratory, Poultry Farm and State Feed Inspection
Laboratories

Adjournment.

Believe it or not, the most difficult part about the arrangements for the facilities was the acquisition of a lectern. The lectern in the auditorium looked like it had been used on the deck of a battleship in the Battle of Leyte for a prayer service in the midst of shell and shot! I should have been buried at sea. We used it the first year, but being ever resourceful, I acquired two wooden Coke crates in 1954, put one on top of the other and artistically covered same with a large piece of black velvet cut out of the skirt of one of my wife, Louise's evening gowns, destined for Goodwill. Louise protested vigorously, and I think shed a few tears when I tried to talk her into permitting e to use a couple of her newer dresses to replace the torn and worn draperies in the Central Auditorium. In a compassionate moment, I gave in and decided that Science--while intriguing and exciting--should not interfere with domestic tranquility! So, we

suffered through the first two Conferences, torn draperies and all. In 1955 we moved to where the action was--Washington, DC.

Getting back to the lectern--during his talk on Broiler Nutrition Research, Jerry was somewhat carried away, and, as he was thumping the lectern to make a point, it started slipping and sliding. I spent the rest of the day periodically getting up on the platform adjusting the Coke crates and trying to keep them covered with the remnants of the black velvet dress that had seen better times.

Yes, the first program, even in its brevity, was the "kick-off" of what has since become one of the best meetings of its type in the United States, if not in the world. Perhaps a prejudicial statement, but one with which few will argue!

Early Participants and Supporters of the Conference

Whenever names are listed associated with a successful occurrence, the author of the list risks slighting those who are accidentally omitted. In this case, any omissions are unintentional. Nevertheless, I feel that, for the record, we should list those University of Maryland staff members and local industry personnel who contributed to the first conference and helped make the ensuing programs successful.

University of Maryland

Position (1953-1954)

POULTRY DEPARTMENT

Dr. M. A. Jull	Head, Department of Poultry Science
Dr. Jerald F. Combs	Professor, Nutrition
Dr. G. Lynn Romoser	Assistant Professor, Nutrition
Dr. Mary S. Shorb	Professor, Research
Dr. W. C. Supplee	Research Associate
Mr. P. F. Twining	Associate Professor, Extension
Mr. Wade Rice	Professor, Extension
Dr. Clyne S. Shaffner	Professor, Physiology
Mr. W. E. Donaldson	Graduate Student
Mr. G. B. Sweet	Graduate Student
Mr. Jimmie Nicholson	Assistant Professor, Extension
Mr. George B. Quigley	Professor, Poultry Husbandry

DEPARTMENT OF DAIRY SCIENCE

Dr. G. H. Beck	Head, Department of Dairy Science
Dr. J. C. Shaw	Professor, Nutrition and Physiology
Mr. W. L. Ensor	Graduate Student
Mr. E. E. Brown	Graduate Student

DEPARTMENT OF ANIMAL SCIENCE

Dr. J. E. Foster	Head, Department of Animal Science
Dr. E. C. Leffel	Assistant Professor, Nutrition

UNIVERSITY ADMINISTRATION

Dr. T. B. Symons	Acting President
Dr. James M. Gwin	Director, Extension
Dr. Gordon M. Cairns	Dean of Agriculture
Dr. I. C. Haut	Director, Experiment Station

FEED AND ALLIED INDUSTRY

Dr. C. D. Caskey	Mr. R. J. C. Fulde
Dr. E. I. Robertson	Dr. John Hammond
Dr. L. M. Dansky	Mr. Carl Sandell
Mr. Sterling Bowman	Mr. Ted Reinke
Mr. R. Dryden	Mr. Sam Golden
Mr. Otis Esham	Mr. Byron Bass
Mr. E. B. Quillen	Mr. Rex Fox
Mr. Merrick Wilson	Mr. Ralph Getkin
Mr. Woody Harrison	Dr. James Waddell
Mr. Frank Perdue	Dr. William Lane
Mr. Preston Townsend	<u>et. al.</u>
Mr. Mel Fell	Mr. Bob Street
Mr. George Wolfe	Mr. Rex Workman
Mr. Johnnie Herrold	Mr. Pete Chichester

Twenty-five Years of Nutritional Progress: 1953-1978

During the 25 years of the Maryland Nutrition Conference (its official name since 1954), there have been twenty or more presentations made at each of the conferences for a total in excess of 500! These talks have covered a wide range of topics. We found an early one that treated the subject of granite grit for boilers--and indicated its non-essentiality! Its author shall remain anonymous.

Topics on nutrition were treated astutely by such well-known scientists as: E. R. Barrick, E. P. Singen, J. C. Fritz, L. A. Moore, H. L. Wilcke, J. L. Krider, H. W. Titus, T. H. Jukes, D. V. Catron, J. McGinnis and many, many others too numerous to mention. Presentations made at the Maryland Nutrition Conference are based on research projects from industry and universities, and represent a scientific effort covering a broad base from the number of researchers per se as well as the Experiment Station and commercial companies represented. The author will cover briefly some of the major milestones as related to research at Maryland, since it is specifically to the title of this article and will help keep it on tract.

Space does not permit other than a listing of major findings which have been adopted for scientific and commercial practice. Other research, some of utmost importance, must be omitted.

1. Isolation of Vitamin B₁₂. (circa 1948-1952)

Prior to the mid-1920's, many people died of a disease known as pernicious anemia. It was found that the victims of the disease could be spared by the daily intake of large quantities of liver. While research was underway to identify the anti-pernicious anemia factor, poultry nutritionists at Cornell, Beltsville and other experiment stations were trying to isolate the "animal protein factor" (A.P.F.).

This A.P.F. was also found in liver and certain extracts thereof, fish meal and cow manure. It was needed in all-vegetable protein diets of chicks to promote growth equal to that obtained with diets containing animal protein.

Dr. Mary S. Shorb of Maryland developed a microbiological assay for the "animal protein factor" in cow manure which aided Merck, Sharpe and Dohme in its efforts to isolate the factor identified as Vitamin B₁₂. A happy day indeed when we received the first samples of the red crystals. The anti-pernicious anemia factor and the A.P.F. were one and the same!

The isolation of Vitamin B₁₂ did not happen specifically within the era which we are reviewing. However, it was important enough to include, since it paved the way for another important discovery during this exciting phase of poultry nutrition. This was the discovery of the growth-promoting properties of antibiotics.

2. Antibiotics as Growth Promotants. (circa 1950-1955)

During investigations leading to the isolation of Vitamin B₁₂, it was observed by Drs. Stokstad and Jukes of Lederle Labs and workers at Pfizer and Merck that spent mycelia residues from antibiotic production contained large quantities of Vitamin B₁₂. However, when such residues were added to chick diets, a growth response was obtained in all-vegetable protein diets even in the presence of added purified Vitamin B₁₂.

Workers at the pharmaceutical companies mentioned found that the additional response was attributable to residual antibiotic(s) (oxytetracycline, chlortetracycline and penicillin).

Within days after the announcement, fundamental research work was initiated at Maryland to determine the mode of action of the antibiotic residues. Practical investigations designed to pinpoint optimum antibiotic levels and dietary conditions required for maximum economic response were also begun.

During these investigations, the importance of the intestinal microflora to bird performance and the effects of the antibiotics on this microflora were brought into perspective.

These two examples of academic and industrial cooperation and collaboration represent the key to progress this country has made in animal nutrition. Furthermore, with the addition of

B₁₂ and antibiotics to the "arsenal", the way was cleared for both fundamental and practical work with amino acids.

3. Practical Application of Synthetic Amino Acids

In another area of nutrition, an amino acid--methionine—was getting attention. At the second conference, Perry Twining and Jerry Combs presented papers on methionine in broiler and turkey rations. Soon after that, a realistic basis for the addition of synthetic methionine was proposed by research workers at E. I. Dupont, Monsanto and the University of Maryland.

This involved effect of energy level of the diet on the requirement, not only of methionine but other essential amino acids. Prior to this time, synthetic methionone was added to rations on a hit-or-miss basis. The tie-in with energy level permitted its economical and now everyday use in practical feeds.

It was at about this time that another directly related concept in nutrition was presented. It went on to become a major factor in the formulation of poultry feeds. This was the Calorie: Protein (C/P) Ration Concept.

4. The Calorie: Protein (C/P Ratio): (circa 1953-1960)

In the late 1940's and early 1950's, Drs. E. P. Singsen and L. D. Matterson at the University of Connecticut demonstrated the value of high levels of dietary energy in improving the feed efficiency of broilers. There were limitations, however, to the extent that a response could be obtained to incremental levels of energy. In fact it was believed for a long time that added fat, a good energy source, above about 5% was "toxic".

Research initiated at the University of Maryland and subsequently at a number of other University Experiment Stations revealed that protein quality and quantity limited the response to increased levels of energy. The "toxic" effects of high levels of energy (over 1300 Ca. M.E./LB) could be overcome by increasing, simultaneously, the protein content of the diet. Manipulation of the ratio between the "protein" and energy of the ration was found to influence the fat content of the bird, its growth rate, efficiency of feed utilization and degree and quality of feathering characteristics. This research was the subject for the Doctoral Dissertation of Dr. W. E. Donaldson, now Professor of Nutrition, Department of Poultry Science, North Carolina State University.

The basis for the C/P ratio was that for each level of protein there is a specific number or Calories of Productive Energy required for optimum performance of the broiler chicken. For a long time, the "magic numbers" were 42 Cal. P.E.: 1% Crude Protein in the starter feed and 50 Cal. P.E.: 1% Crude Protein in the finisher feed.

The concept received wide acclaim in the scientific and popular press and became the subject of many research programs elsewhere. Perhaps the single release which led to its commercial adoption was published in Feed Age, entitled "A New Approach to Poultry Feed Formulation" (Combs, G. F. and G. L. Romoser, March 1955).

To demonstrate the concept, high-energy feeds containing 15% added fat, 15% isolated protein and about 25 other ingredients were fed to (by today's standards) an ancient broiler cross—Dark Cornish x New Hampshire. At the end of 52 days, male chicks weighed 3.01 pounds with 4.81 pounds of feed or 1.60 pounds of feed per pound of gain. At today's prices that feed cost about \$300.00 or more per ton. While this performance may not raise many eyebrows today, when mixed sex averages of about 4.0 pounds are obtained in 56 days on 2.0 pounds of feed, it was an "earth-shaker". Then, under practical conditions, it took about 77 days to reach a 3.0 pound mixed sex average and approximately 9 pounds of feed per bird.

A table from the referenced article is reproduced which shows the results obtained when the C/P Ratio Concept was applied to rations considered practical for those times.

EFFECTS OF ENERGY-PROTEIN ON RESULTS OBTAINED
WITH BROILERS FED PRACTICAL RATIONS

<u>Crude Protein</u>	<u>Average 10 wk. Weight, lbs.</u>	<u>Feed/gain</u>	<u>Cal. P.E. for each 1% Crude Protein in Feed</u>
20.1%	2.89	2.78	45.0
21.5%	2.99	2.69	42.8
22.2%	3.15	2.61	40.8

While the C/P Ratio Concept was of value in the practical formulation of feed, research led to the adoption of "amino acid" rather than "protein" requirements. Now, instead of relating "crude protein" to a given energy level, we think in terms of grams of a given amino acid per megacalorie of energy.

The Feed Age article contained a segment entitled "Nutritional Worth of Feed Ingredients". This system of calculating the "partial nutritional worth" of a feed ingredient I sometimes look upon as the forerunner of linear programming. With this concept, it was possible for the nutritionist or purchasing agent to determine if, for example, meat scrap was a better "buy" than fish meal. It was necessary, however, to know the delivered prices of corn and soybean meal in order to get at the answer.

Work initiated at Maryland led to the development of nutritional matrices (nutritional restrictions and ingredient analyses) which are in use today in many computer programs. Present Poultry Science Department members continue upgrading and refining these values. Earlier evaluations led to the adoption of many ingredients in today's feeds which were only experimental curiosities 25 years ago.

5. Research with Practical Feed Ingredients (circa 1994 to present)

Work is continuing at the University of Maryland and elsewhere to find economical sources of nutrients for poultry and livestock feeds which will permit the expanding population to purchase meat, milk and eggs at economical prices.

Research has led to the elimination of certain ingredients from the feed bag and the gradual adoption of others. These investigations helped to concentrate the feed, thereby permitting an improvement in its nutrient density.

Grit is now a thing of the past, since it was found that all-mash feeds eliminated its need. Highly fibrous ingredients—wheat bran, as an example—are gone from broiler feeds and the economically available crystalline B vitamins and purified fat soluble ones have permitted the elimination of many other ingredients of low nutrient density.

Other ingredients, the subjects of many interesting research studies, are now commonly accepted. Some of these are: dehulled soybean meal, feather-meal, hatchery waste and even hydrolyzed broiler litter.

6. Research with Chemical Feed Additives (circa 1994 – present)

Efforts of chemical and pharmaceutical companies have greatly enhanced the production of animal protein. Of course, some combinations of chemicals which were fed in earlier days may raise some "regulatory eyebrows", but such studies led to the improvements in disease management, growing conditions and nutritional balance.

Research projects leading to the acceptance of certain chemical additives were: Vitamin *k*, for hemorrhagic syndrome; organo-arsenicals improved growth rate and pigmentation characteristics; chemobiotics and antibiotics and growth rate; coccidiostats and vitamin requirements as related to the energy content of the diet; and the role of antioxidants in nutrition.

Well, my better judgment tells me that, alas it is time to "close the cover" on the past and direct our closing thoughts to the future.

Advances in Nutrition of Livestock

My examples of advances in nutrition have come largely from the poultry field. Time and space limit a similar documentation of progress with other species. Twenty-five years have seen marked changes in the quality, quantity and efficiency of large animals produced for meat. Antibiotics, hormones, other have had dramatic effects on red meat production by swine, beef and sheep. Average annual milk production per dairy cow had doubled since the first conference. Research at Maryland and laboratories throughout the nation and indeed much of the world has contributed to these advances.

Proceedings of the twenty-five conferences provide a concise but complete review of new findings and better application of existing knowledge for the production of animal food products.

What Lies Ahead?

In reviewing the films of the early Maryland days, I found several popular articles on what the future holds for nutrition. Some of the predicted goals have been surpassed: others have yet to be achieved. At this point, it would be redundant to reiterate those predictions.

Topics in today's program represent current concerns and issues with influence for the future. What will be the role of growth promotants over the last 25 years? Can we keep feeds and foods clear of contaminants and toxic materials and acceptable to the consumer, and still produce animal protein efficiently and economically?

Will more effective use of land resources for forages give added strength to food production from ruminants?

What will the new emphasis on human nutrition, both quantitative and qualitative, mean to the animal protein industry?

Will "Georgia Cement Dust" open new opportunities for efficient management of diets for animals and poultry?

Certainly expanding world population is a cause of concern. Future effort will evolve around better food for more people. We will have to continue not only to improve nutritional quality of feed ingredients, but must evaluate with increasing vigor the role of other synthetic amino acids (lysine and tryptophane) and find new ways to preserve the nutritional quality of ingredients which will be available for animal feeds.

We must utilize more fully feeds for livestock and poultry which are not desired in the human diet.

Today, we do know more about "acids" as referenced by our earlier visitor, but as time passes there will be an ever-present need to learn more and more about more and more. Presently, there are at work in many laboratories, young, capable nutritionists—with a flair for practicality (I hope) --who will be providing much food-for-thought and subject matter for the Maryland Nutrition Conference--2003—The Golden Anniversary! I hope we are there to hear it.