Iowa ranks first in soybean production, producing about 17 percent of the nation's soybeans.

Collectively, Iowa farmers have $68.9 billion invested in their business. This includes over $50.3 billion in land, $10.3 billion in crops and livestock and about $5.7 billion in farm equipment.

The average per farm investment in land and buildings in Iowa is $430,410—compared with the national average of $321,600.

Iowa farmers spend more than $10 billion each year for production expenses. This includes:

—$1,380 million for feed
—$720 million for fertilizer
—$1,044 million for repairs, maintenance and operation of machinery, vehicles and buildings
—$833 million for interest on farm mortgages
—$361 million for property taxes
—$326 million for hired labor
—$334 million for seeds

Iowa farmers produce $3.03 billion worth of products for farm export. This is equal to 30 percent of the state's cash receipts from farm marketing. Iowa's farm exports are the second largest in the nation.

Iowa Department of Agriculture

Photos & Information by: Greater Des Moines Convention & Visitors Bureau

XIII World Congress on Cattle Diseases

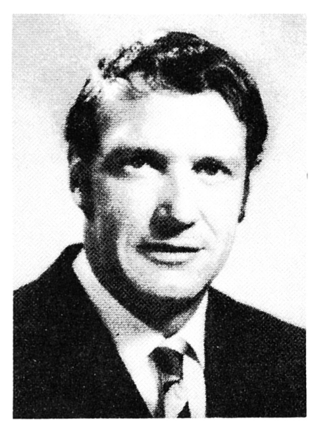
Durban, South Africa
September 17-21, 1984

The XIII World Congress on Cattle Diseases was held in Durban, South Africa on September 17-21, 1984. Over 1000 veterinarians, spouses, exhibitors and guests attended from 23 countries. The congress was sponsored by the World Association for Buiatrics in collaboration with the South Africa Veterinary Association and the South African Rural Practitioners Group.

Professor R. I. Coubrough was chairman of the Scientific program and Dr. Issie Bacher was chairman of the organizing committee. A South African Small Animal Satellite Symposium was also held.

The opening ceremony was held on Monday morning, September 17, with Prof. Coubrough, Master of Ceremonies.

DR. ISSY BACHER B.V.Sc.



PROF. R.I. COUBROUGH

The Keynote Address given by Dr. Eli Mayer, Haifa, Israel was a masterly review of the role of the bovine practitioner.

Dr. Harold Amstutz retired as president of the World Association for Buiatrics having served for 12 years and was made Honorary President. He was succeeded by Professor J. Espinasse, France who presented Dr. Amstutz with a Medal of Honor for his service to the association. Dr. M. Stober, Hannover, Germany will continue as Secretary-Treasurer.

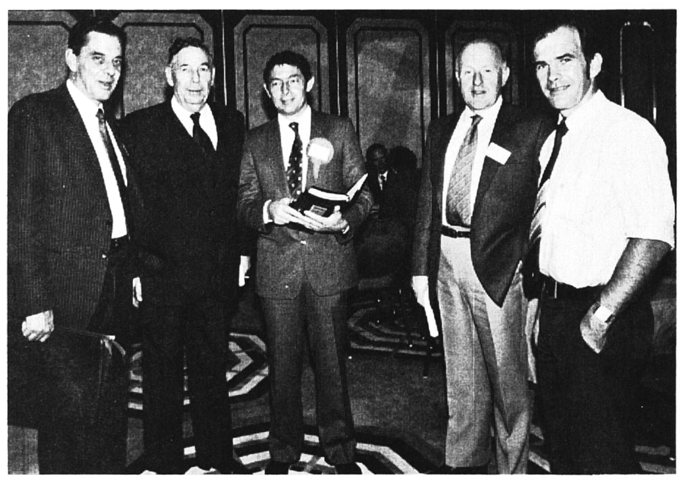
The Congress program focussed on the problem of the individual animal being seen in the context of the whole herd with veterinary involvement being integrated into a planned management program amid at efficiency of production within acceptable economic bounds. Over 190 papers were presented with simultaneous translation in four languages.

The XIV World Congress on Cattle Diseases will be held in Dublin, Ireland on August 26-30, 1986.

Dr. Eric Williams, U.S.A. gave the closing address as follows: "Mr. President, Dr. Coubrough and my noble colleagues from across the globe. Our friends from Ireland ran out of whisky so they left early to go home to prepare a lot more for the party they are planning for us in two years' time! On their behalf, and in my best Welsh-American-Irish accent it is my pleasure to invite you, one and all, to attend the 14th Congress which will be held on August 26-30, 1986 in Dublin, fair city, where the girls are *so* pretty (and the men are not so bad, either!) We will wheel the wheelbarrow full of the best program and entertainment you ever saw, and the streets, broad and narrow will echo with a thousand welcomes for you or, as they say in Ireland, *"céad míle fáilte."*

And now, it is my pleasure, but with considerable nostalgia, in closing this assembly, to thank our South African colleagues for an outstanding Congress and their hospitality. To all of you, I bid a safe journey home and let us reassemble in Dublin, alive, alive O!"

Convention Highlights



Keynote Address . . .

The Challenges of the World's Increasing Food Shortage and Optimal Milk and Meat Production Capacity Confronting the Veterinarian in Bovine Practice and Research in the coming Decades.

Dr. E. Mayer
"Hachaklait" Veterinary Services,
P.O.B. 9610,
31096 Haifa, Israel

"Since the destruction of the Temple (AD 70) the gift of prophecy was bestowed upon children and fools."
(Babylonian Talmud)

Mr. President, Ladies and Gentlemen, Dear Colleagues:

When Professor Coubrough advised me of the Scientific and Organizing Committee's decision to invite me to present the Festive Opening Lecture, I felt, and still feel, highly honored. I would like to take this opportunity to thank them for this high distinction. Little did I know, when gratefully accepting, that preparing and writing this paper would become the most difficult calving I have ever had to make. There is a vast difference between preparing a subject for bovine practitioners, using professional jargon and shorthand, and composing it comprehensively for this pleasantly mixed audience. I learned, to all our detriment, that I am not exactly gifted for the latter.

Ours is a World Association and this is a World Congress. We group members from countries producing below 800 liters of milk per dairy cow per year, as well as from countries producing averages of 5, 6, 7 and 8000 liters, with dairy herds producing from 400 to over 13,000 kg/cow/year. In order to produce one ton (t) of meat, we need five bovines in the USA, 20 in Australia and 200 in Africa (1). In 1900, one U.S. farmer produced food for seven persons, in 1950 for 16 and in 1980 for 60 (2). Thus, only 3% of the U.S. labour force produces food for the entire country plus its enormous exports (3), while an average of 59% of the labour force in the developing countries (DVC) were employed (4). U.S. citizens spend but 17% of their takehome pay on food (including everything from TV dinners and frozen pies to ⅓ of their meals in restaurants at $15 per meal). Canadians spend below 20%, Europeans about 23-35%, Indians 75%, in spite of the fact that a high percentage eat no meat, and the red Chinese 80% (5). (The per capita GNP in 40 DVCs is below $200 a year).

Protein of animal origin (excluding fish and seafood) is produced by 1200 million (m) bovines, 1600m sheep and goats, 780m porks and 6600m poultry (6). The 362m Asian Bovines (30%) produce but 7.9% of the World's meat, while the 466m head of the Western World, including Russia, produce 71%, and 85% of all milk. Europe, having but 11% of the World's bovines, produces 42% of its milk. Per capita, protein consumption ranges from 98.2 gr/day, in the USA, of which 70.7 grams is of animal origin, to 48.8 grams and 6.3 grams respectively in Southern Asia. (6a). There thus exists a direct relationship between income and animal protein consumption (4). In order to increase animal production, grain is fed to all species mentioned, the highest percentage in the industrial countries.

The absolute number of people consuming daily food rations inferior to the critical minimal limit was 360m in 1969-71. After the oil crisis in 1973 this number increased to 415m in 1974 (68m in Africa = 22% of the total African population, 286m = 27% in the Far East, 41m in Latin America = 13% and 19m = 11% in the Middle East) (4). According to today's estimates, this number rose to 500m in the early 80's. (The World Bank figure for 1980 is 780m.) This catastrophy occurred while food production increased worldwide by a yearly average of 2% in the West and 2.9% in the DVCs (in some this increase reached 3.5% and even 5%). The main reason for this being the population explosion.

A population of 4.3 millards in 1982 will grow to 6.2 milliards by the year 2000, to 10.2 milliards by 2100. Ninety percent of this growth will occur in the DVCs, making up 72% of the World's current population, thus reaching 87% by 2100. Therefore, we shall have to increase World food production by 50% by the turn of the century and more than double that by 2100. An additional 25m tons of grain per year are needed to keep up with this growth population (7).

Thanks to the "Green Revolution" (the introduction of highly productive cereal grains) in 1965, many DVCs became self-sufficient. Mexico and the Phillipines changed from grain importers to grain exporters. As a result of the prohibitive rise in oil prices, most of these countries regressed, once again becoming grain importers by 1975. This same manifold increase in oil prices seriously curtailed the ability of the developed countries (DC) to provide foreign aid. (The ironic sequel to this sad story is that Australia, upon stating in 1976 that they would have to demand remuneration for the heavily increased energy expenses involved in the production of the 1m tons they regularly contributed free of charge, they and the other donating countries were pilloried and not the nouveau riche monopolists of the oil cartel.)

These same reasons forced the industrialised countries to become self-sufficient in animal protein production, halting their imports and severely hurting meat and agricultural produce exporting countries. Export of meat from Latin America alone, dropped from 21.48% of the entire World market in 1967 and 26.66% in 1970, to but 9.03% in 1975. (Meat exports from Europe increased from 35.01% in 1970 to 62% of the entire World market in 1975.)

The Judeo-Christian religions have created a moral code evolving and enhancing a profoundly felt sense of responsibility and have imbued us with a capacity for both feeling pain and extreme unease, even guilt, at others' suffering. We thus condemn ourselves for feeding large amounts of plant protein and energy to animals while 500m people are starving. We do so, because we have learned that the efficiency of conversion to animal protein is for milk, eggs and poultry only 22-25%, and for ruminant meat only 5%. This means a loss of 75-78% and of about 95% of plant protein respectively. As a result, a vociferous lobby demands that less grain be fed to animals (thus lowering animal production) and be supplied instead to the needy. It does not matter to them that at present energy prices, grain cannot be given away anymore, transportation overseas of 100m tons a year and above causes unsurmountable logistical problems . . . and its cost is prohibitive. (Decades of experience under normal oil price conditions have taught us that free grain shipments rarely reached the really needy and hardly ever free of charge.) Somebody once said that a little learning is a dangerous thing. The present aggressive clamour aided by a certain type of irresponsible press proves it. Our profession, having devoted many decades to study, research and treatment in order to increase production and maintain animal health, stands accused of aiding and abetting the starvation of children because we encourage the feeding to animals of certain amounts of grain. We do nothing to explain because we are somehow uneasy, even ashamed and guilt ridden, to eat our steaks while children starve.

Let us present the facts: 1) The cow is a ruminant, can digest cellulose and utilise non protein nitrogen (NPN). 2) Cellulose is the most abundant organic product on earth. It is estimated that for each person alive, 150 pounds of cellulose waste are produced each day (8). Ruminants are the only major class of animals that can metabolize cellulose to produce energy. Over 60% of the available land is suitable for grazing only, producing forage valuable to humans only through livestock production (7). In addition, for every kg of rice, wheat, corn or sorghum produced, there is at least 1 kg of other plant products, mostly cellulose, that is potentially usable only by ruminants. If only 5% of the total cellulose waste could be processed, it would provide sufficient dietary energy to produce the World's protein needs (8). Cereal straw production in Asia totals 600m tons a year. In Africa and Latin America, 200m tons; banana, cassava, citrus fruit and coffee residues in Asia, Africa and Latin America equal 124m tons; sugar cane residues: 83m tons. Available for animal foods are 40% of root and tuber crops, 60% of grain crops, 85% of oilseed crops, and 90% of sugar crops (8) as well as excess and waste of vegetable production. 2a) Animal wastes: Cattle manure can be an important ingredient, mainly in ensiled form, 40% in the ration have been fed with no ill effects. We feed poultry (broiler only) manure to beef cattle, and an ensilaged one to heifer calves, late lactation and dry cows. Algae containing 45-65% of crude protein are easily grown on human and animal waste waters and dried for fodder (8). 3) The question has never been how much plant protein and energy is fed in order to produce high grade animal protein, but how much human edible protein (HEP) is fed and how big is the return. 4) Efficiency of food conversion in the cow increases with high production both of meat by 8% and of milk (expressed in grams of protein per Mcal of digestible energy). There is a 10.5% efficiency at 3600 kg on pasture alone and a 20.5% at 13000 kg on 65% concentrates (9). 5) For milk production an input of 15.9% HEP gives a return of 181%, for meat 4.9% yields 109%, the ruminant performing much better than the pork (86%) and poultry (75%). (10). To paraphase Professor von Engelhardt (1), who has kindly lent me these slides, we can thus not only eat our steaks, but do so with a clear conscience.

To conclude this lengthy, but in my opinion necessary introduction to the condition directly influencing, limiting and often dictating our worldwide professional activity, permit me to add the following in telegramme style:

1) Since the oil price squeeze in 1973, the Industralized countries are rich no more (unemployment, bankruptcies). They are at long last beginning to realize it.
2) Milk, basic meat and grain prices are government determined and controlled (subsidies, etc.).
3) The mountains of butter and milk powder dumped on the world market are therefore the direct results of faulty government planning and policy.
4) A strict milk production quota has now been introduced in West Germany, paying 60 pf per planned 1 liter and but 10 pf for excess.
5) Other economy minded governments will follow, deciding to subsidize production in certain less favored areas only (e.g. dual purpose cattle in lower mountainous regions such as Bavaria, Haute Savoie, etc.).
6) For many reasons each country remains interested in keeping its rural population thus being able to supply its own food, mainly fresh milk.
7) Intensity of milk production is dictated by geophysical considerations. New Zeland, blessed with abundant pasture, feeds no concentrates, but has nevertheless a medium milk production average due to an excellent genetic scheme. Israel, having no pasture, a penury of water and a hot climate has devoted half a century to producing a high yielding, climate adapted cow, always labouring under a strict quota of both milk and water (thus low roughage content ration).
8) Thus, government and/or geophysical considerations determine production policies and its economics, NEVER our best professional opinion and advice.
9) Our profession is therefore forced to maneuver within the confines of these dictates and adapt our research, health programmes and even clinical service accordingly.
10) To underline constraints we labour under, permit me one final example: In 1940, the US invested 40% of its research budget in agricultural research, by 1973, only 1.8%!! (7). In many other countries conditions are worse.

It is obvious that the problems facing the profession in both research and clinical practice differ enormously not only between beef and milk herds, but between the DVCs and the industrial ones. In the latter, peaks in agricultural production have been reached. The yearly loss of land to urbanization, ½m acres in the U.S. alone, coupled with an almost zero population increase, will enable them to remain self-sufficient through intensification, and continue exports. Except for "imported" infectious diseases, their problems will be those of production and Management diseases.

In the DVC we have a 90% increase of the World population, but a capacity to increase existing (750m hectars) arable land by 26% (113-150m ha), gain 14% additional crops and 60% through intensification (4). In these 90 countries animal production makes up 19% of the entire agricultural production and should be increased by 22% by the year 2000. This means a yearly production increase of 4.5%. In order to achieve this enormous target, we must:

a) Upgrade production capacity and disease resistance;
b) Introduce production oriented management systems;
c) Improve microbiological and parasitological disease control and eradication.

This can be solved only by ensuring an adequate nutritional basis both qualitatively and quantitatively. Pasture must therefore be improved, if possible by drought resistant leguminous species, a good animal carrying balance instituted, food storage facilities created and an increased amount of concentrates (56m t today) introduced, coming from their own increased production. (FAO evaluates the quantities needed at 171m t.) (4).

Local cattle breeds in many of the DVCs may have a stunted growth and low productivity, but they are resistant to local diseases, malnutrition and drought. As conditions will improve slowly, upgrading should be carried out by crossing desired characteristics, never by introducing imported non-resistant cattle.

The low value of the animals, communication difficulties and non-existing roads will render ineffective clinical veterinary help to the individual for decades to come.

All efforts should therefore be concentrated on large scale schemes of infectious diseases eradication and control, genetic upgrading and improved nutrition. Through the correct application of these measures animal production can be doubled. These programmes should be carried out with massive help from the industralized nations, in money, specialists and research, not only for humanitarian reasons (500m underfed) or animal protection (our profession's goal), but also for reasons of self-protection against the spread of infectious diseases to our totally unprotected cattle.

Through decades of genetic planning and selective slaughter, we have created very highly specialized bovine races, capable of both top milk and beef productions. Frozen semen enables us to introduce these genetic characteristics into any country and herd; embryo transfer permits the immediate creation of whole herds of pure-bred dams anywhere, allowing them to calve 2¾ years later. Existing evidence tends to show that the genetic potential for production is much higher than the levels actually produced to date, permitting us to concentrate our breeding efforts and selection on different parameters.

These parameters include: a higher fertility rate, longevity (at present only 3 lactations); persistence in lactation (lower peaks, long stable production curve); higher milk protein levels; adaptation to the higher temperature/humidity index; quicker return to maximum food intake post-partum (at present 6-8 weeks); better metabolising of food; and specifically for beef cattle: adaptation to environment, ease of calving, general adaptability, parasite resistance, growth rate, muscle to fat ratio (11); and for both: specific disease resistance.

The present breeding programmes have two main drawbacks:

1) Bulls tested to date are evaluated on the performance of their daughters during their first lactations only. In many cases, culled heifers are not even included (the U.K. programme includes only heifers producing above 200 days). Many disease manifestations — mainly production and metabolic related — occur during later lactations, only. Milk production and reproduction, the two most important factors, can only be evaluated after several lactations.

2) In spite of the fact that culling for metabolic reasons occurs only in the female, the male has by far the greatest impact in selection (few bulls used). Bulls are reared and kept under totally different conditions, for instance are never exposed to high production stress, forced lipo and proteinolysis, etc. Being very valuable (A.I. Bulls), they are hyperprotected by meticulous often exaggerated vaccination programmes effectively hiding any possible disease resistance trait.

Nearly all the characteristics we should select for in the future demand the creation of new breeding programmes and the generalized use of frozen semen of bulls only after several lactations of several hundreds of their daughters have been studied. The Norwegians have introduced a scheme by which bulls are also progeny tested for diseases in second and third lactating daughters. These results are taken into account when deciding which bulls to buy sons of. The disease history of the bulls' dams is also taken into account, as well as their fertility standard (12). This is a definite improvement, but future research should concentrate on the search for genetic markers. Recognition of gene products does appear to be a prerequisite for controlled genetic engineering (13). Correlations between histocompatibility antigens and disease susceptibility have been demonstrated in humans and some animals. Similarly strong correlations should be looked for in cattle so that lymphocyte antigens might be used as markers for selecting disease resistant animals. (11).

The Bovine Clinical Practice: past, present and future: Ours is a relatively new discipline with but a short history. It started with the slow introduction of the car, lorry and tractor gradually replacing the horse as sole agricultural power, in the late 20s and 30s, and the movement of dairies and fattening lots from the cities and their suburbs to the country. It was only in 1935 that Calcium Borogluconate was first used in milk fever therapy, 1936 that the first sulfadrug was introduced (Prontosil) and 1938/9 when the first babesicides were discovered (Quinuronium Sulphate, Penamidine). (14).

The almost universal food shortage created by World War II and its aftermath imposed intensive local meat and milk production efforts, backed by applied research and the first generation of specialized bovine practitioners. National yearly milk production averages were about 3000 kg/milk/cow, dairy herds small and numerous. Clinical practice was, and often still is mixed of the urgent call fire extinguishing type. The eradication of some infectious diseases, the control of others through new vaccines, the discovery of a whole arsenal of novel therapeutic agents (antibiotics, antiparasitic), the introduction of nationwide A.I. schemes enhancing speedy scientific genetic upgrading and selection have created specialization in dairy farming, leading to intensification. The introduction of machine milking, cup removers, self feeders, scientific feeding and/or supplementation, gave rise to increasing production and herd size, while eliminating small and inefficient herds. This intensification has brought about the emergence of Management Diseases: Mastitis; Milk Fever; Acidosis; Ketosis; Fatty Cow Syndrome; Fatty Degeneration of the liver, kidney; Abomasal Displacement; Infertility (and its many components, Anoestrus, Silent Oestrus, Retained Placentas, the different types of Metritis, Ovarian Cysts, and Repeat Breeder Syndrome); and diseases of calves and of Feedlot Cattle. With but a few exceptions, all of these diseases were well known, but not as MANAGEMENT, MAINLY NUTRITION INDUCED HERD PROBLEMS! I shall analyze a couple:

Milk Fever: Though Dyrendahl et al. (15) have reported a low but significant correlation between the incidence of milk fever and milk yield in daughter groups of different bulls, this hereditary factor is low, should and can be selected out, does not change the fact that M.F. is a Management Disease par excellence. Since 1975 all Norwegian dairy herds have been incorporated in a herd health computer programme. In 1982, out of 321,000 diagnoses and treatments, 9.7% were for M.F. (On the same page Solbu (12) shows that the frequency of treatment percentage of M.F. in all herds is 5.7% for third; 11.9% for fourth: 16.7% for fifth; 19.6% for sixth; and 19.5% above!!) Ketosis made up 24.2% of all treatments. Hove and Halse (16) report that Ketosis frequency in Norway rose from 4% in 1950 to 12% in the 1970's, together with an increase of average milk production from 3000 to only 5000 kg/yr. The percentage of Ketotic cows has remained well above 10% ever since.

Our national Clinical Veterinary Services cover almost 100% of all dairy cattle in Israel. Being one centralized clinical organization, we have exact clinical records going back well over 50 years (summing up over 100 different disease diagnosis). We introduced individual cow health cards in the late 30s. For reasons of economic necessity we were obliged to select for a maximum of milk produced by a minimum of cows (alternative value of water, and zero pasture) and a capacity to consume 70% of concentrates and above. We held the World record of national milk production per cow for over 25 years. We passed the 5000 kg milk average in the 1950s and the 8000 kg mark in 1983. Although we may have bred out the genetically low M.F. and ketosis hereditary factors, the fact remains that nationwide, milk fever frequency in Israel never passed 3.5%, is well below 2% today and that in areas where Ca consumption during the dry period was kept below 50 gr./day, M.F. frequency dropped to below 1%. In all herds with high frequency occurrences of M.F., nutritional mistakes were shown to have been made. Our national clinical Ketosis frequency is very low, below 1%. We should thus conclude that it is not the increased production, but management and nutritional factors that determine M.F. percentages.

Mastitis: Streptococcus agalactiae can be and is being eradicated in many industrialized countries. Cleansed herds can be kept so by rigorous udder control of newly introduced heifers (kept to a minimum). *Staph aureus* infection can be eradicated by a costly test, treated and slaughter programme, but can also be kept at acceptable levels by marking all infected cows, slowly culling all dispensable ones and milking all staph cows at the end, after the healthy ones. The main "infectious agent" is the milking machine and its incorrect use. Udders should be clean and dry, overmilking avoided, teats dipped before exit. and cows kept standing or walking for 10 minutes (with distribution of tasty food as inducement) to give the sphincter time to close before the cow lays down. A laboratory diagnosis of all clinical mastitis cases as well as an antibiogramme should be made to determine which therapy should be employed, if necessary. Blind treatments are usually wrong, as is non specific dry cow therapy. Mastitis, too, has become a herd problem caused by management factors.

The entire structure of bovine clinical practice must adapt. In order to remain effective, our approach to herd health problems must become preventive. Normal disease averages for the various regions should be ascertained, their frequency compared with known national and international norms. Exact records (computerized wherever possible) for each herd should be kept, and variations pinpointed as early as possible. For almost the entire precited list of diseases, the management factors causing or contributing to them are well documented, and can be ascertained by an epidemiology-type on-the-spot, investigation.

Urgent calls must still be dealt with as in the past, but regular visits must be introduced, their frequency depending upon herd size, intensity of production and the severity of disease problems. These regular visits should cover: 1) all new sick cases; 2) follow-up treatments; 3) pregnancy examinations (at about 40 days to "gain" the next oestrus in cases of negative pregnancy results); 4) post-partum rectal examinations: in fertility problem herds all cows with pathological parturition or post-partum problems (ret., plac., metritis, etc.), all cows not seen in heat by a predetermined post-partum interval, all cows inseminated three times and returning in heat, all irregular oestrus cases and, obviously, all cows returning in heat after a positive pregnancy diagnosis.

Did I hear someone ask who is going to convince the farmer to pay for these examinations? Well, if he needs convincing, try the following. There are only two kinds of herds, those that are and those that are not pregnancy examined. Those that are not, rely on the 60-90 days non-return results. Our analysis (17) shows that 8.5% of the so-called pregnant non-return cows are not pregnant, and can, if examined, thus be recycled in time. The milk/progesterone test gives us at best 16% of false positives. If these 8.5% false positives don't convince him he better give up dairy farming.

Regular visits promote effective control of all occurences within a herd, and the introduction of preventive measures as early as the problem is diagnosed. We are all aware that early intervention is the secret to therapeutic success and comes second only to prevention.

In order to conclude this chapter on the needed bovine clinical practice, I must say a few words about the dairy cattle under our care in the industrialized countries. National production averages have soared. The better herds in all our countries are high producing ones. Cows can consume only about 3.5 kg of Dry Matter (DM) for every 100 kg of bodyweight — about 21 kg DM for a 650 kg cow. Under the best management conditions this can cover the production of only 40-42 kg/mild/day. High producing cows produce far above 50 kg per day as early as 2-3 weeks p.P. Even cows dried off at 30 kg/milk/day, consuming 20-21 kg of DM, are incapable p.P. (even after being fed high concentrate rations for 14 days ante-partum) to consume more than 13 kg of DM, and need 6-9 weeks of resume maximal food intake. During this time and often much longer, cows mobilize their body fat and protein to supply the needed energy for milk production, thus losing weight. All pathological events occurring during this period are enhanced by the negative energy balance and thus lowered defense mechanism. I have christened this about a decade ago. The Post-Partum Stress Syndrome (though somebody may have preceded me there. too). In answer to Professor Coubrough's special wish. I shall mention the following:

The capacity of cows to resume top consumption p.P. after an interval of only eight, sometimes six weeks, of a dry cow ration, has bothered me for over a decade. Numerous examinations of the digestive tract of cows in different stages of lactation and the dry period in the abattoir have taught me that a definite change of both form and size of the rumenal papillae occurs during the dry period, seeming literally to degenerate. It is only around parturition that a slow growth and regeneration occur. I mentioned this in 1978 (18), and the results of our first systematic study of this physiological change (the histological research done by Professor Liebich) were published in 1980 (19). Intensive research continues (19a). We have proved that bigger papillae show increased resorption. A totally novel morphological phenomenon has also been discovered, which will be presented here by Professor Liebich. The extremely important nutritionally caused papillae conformation changes induced in dry, not pregnant cows. and their resorption capacity, will be presented here by my friend and team-mate Professor Dirksen. *Therefore, I can announce today that the physiological reason for the incapacity of cows to ingest the normal amount of DVM p.P. has finally been elucidated. How to prevent or minimize this degeneration remains to be discovered.*

The elucidation of the reason does not solve the problems of the p.P. Stress Syndrome we face. All calving pathology and p.P. gynecological problems from Retained Placenta to Metritis, occur during this period of lower resistence thus causing infertility problems in the future. Regular clinical visits permit early diagnosis and initial treatment, regular follow-up treatments and early intervention at first signs of anoestrus, thus permitting the cow to get pregnant in time, avoiding her culling. In spite of a high percentage of p.P pathology in Israel, culling for reasons of infertility is thus kept below 10%, thanks only to early pregnancy examinations, and early intervention due to weekly (or more frequent) visits.

Permit me to strongly underline one point: *never* succumb to the concept that in large herds treatment of the individual is not important. Our long experience has shown that it is precisely the treatment and care devoted to each individual, facilitated by regular visits, that have permitted us to reach our low culling and death rates.

Veterinary drugs: (Today: Serum and Vaccine = 25-30%; Anti-infectious drugs: 20-25%; Anti-Parasitic: 20-25%; others 20-30% (20).) As stated earlier, herd management disease problems will compose more and more of our clinical work. Their prevention will be our main occupation, because they are the main cause of lowered production and rentability. Therapeutic agents should therefore have the following objectives: eradication of infectious disease, zoonoses, and increasing animal production (20).

Drugs of the future must be produced in a form easily applicable in large groups, and must remain economically attractive. Wherever necessary, long acting drugs should be developed and a broad spectrum of activity sought (mainly in anti-helminthics). Preparations with one or the other of these characteristics have recently appeared on the market: 1) A steel tube with permeable membranes containing the anti-nematode, "Morantel," releasing therapeutic quantities for 10-12 weeks. 2) "Control Release Glass" (CRG) boluses, containing trace elements released in the forestomachs of cows and sheep for six months, releasing exact predetermined amounts of Cu, Co and Mg (have been described by Allen and Sansom) (21). 3) "Pour-ons" (used against warble flies for years). 4) A photostable insecticide (cypermethrine) containing slow release ear tag, active for several months against insect bites. 5) "Trypamidium," trypanosome preventive and trypanocide, conferring immunity, which can be upheld by re-injecting every 2-3 months. 6) An imidocarb, "Carbesia," used for anti Babesiose treatment, conferring at the same time a 4-6 week chemio-preventive activity. 7) Herd oestrus synchronisation seems to date the only way of economically introducing A.I. into beef herds, permitting to cross into large numbers desired characteristics of pre-selected bulls. The various prostaglandins can be employed. In a series of experiments, soon to be published, Tiomkin and I have achieved interesting results with Synchromate B, an ear implant containing progestagen, synchronising beef cows (22). It also can be used to replace the heat detection effort permitting insemination at a precise predetermined hour. The use of PRIDS coupled with one of two prostaglandin injections has been described for the same purpose (23). 8) "Compudose," a silicone rubber implant containing 17 beta Oestradiol, releases the required doses of this anabolishing agent for 365-400 days. The implant is withdrawn 24 hours before slaughter, leaving the carcass with a lower than normal hormone concentration! (The meat may then be grilled multiplying by many thousand times the composite cancerogenes.) 9) Just a few words on Growth Promoters: Their aim is to increase feed efficiency and/or weight gain. Ionophores (Monensin. Lasalocid) do so by acting on rumen fermentation, Anabolic Agents (Zeranol, Estradiol and its combinations) through direct metabolic action, Antibiotics (in widespread use for the last 30 years) by acting on the intestinal microflora. Anabolic Agents do not act on the digestion of feed, but their consequent pathways are influenced positively by action on the intermediate metabolism, increasing anabolic processes or inhibiting catabolic ones (26). Thus, retention of nutrients in the body is increased, N excretion lowered and weight gained from 1 kg feed increased. Anabolic agents can be subdivided as follows (26): Stilbenes (now forbidden) Natural Compounds (Estradiol 17 beta, Testosterone, Progesterone); Non-stilbene Xenobiotics (Zeranol, Trenbolone Acetate, Melengestrol acetate); and Growth Hormone and other associated compounds (G.H., G.H. Releasers, Somatomedine and Somatostatin).

Animal and treatment related factors determine the magnitude of the physiological response to anabolics (26); they are: a) species specific; b) influenced by sex (hormones); c) age related (stages of sexual maturity); d) influenced by composition of the ration (mainly protein content); e) the dose is dependent on mode of administration (oral, injected, implant) and the site; f) blood levels, dependent on the number of times administered; g) administration time before slaughter (because of peak response); h) and type of releasing device.

Today's arsenal is composed of the natural compounds and the non-stilbene Xenobiotics, tomorrow's potential seems to be represented by the G.H. associated compounds because of recent successes with recombinant DNA research.

In this context, Joechle (27) believes that in the future, compounds modulating neurohormonal regulations should create attention in the search for safe as well as economically attractive anabolic agents, because of the following facts:

a) Propranolol increases GH plasma levels in dairy cows.
b) Increased numbers of beta-adrenergic receptors per cell are found in lactating (versus dry) cows and are associated with the mobilization of greater amounts of FFA and Glycerol to meet challenges by negative calorie intake during early lactation (28). Consequently, their increase, in general would be desirable.
c) Clonidine, a potent alpha-receptor stimulator, causes protracted insulinemia and hyperglycemia (29).

Joechle also believes that immunoneutralization of hormones will create additional pathways, since active vaccination against somatostatin seems effective in increasing GH levels and causing weight gain (27).

10) Vaccination of pregnant dams against specific microbial agents causing diseases of the newborn, produces a colostrum rich in specific antibodies, conferring a passive immunity. By using colostrum pools, the vaccination of a limited number of dams may suffice for the production of hyperimmune colostrum for the entire offspring. This method has been used successfully against enteropathogenic E. Coli strains (24) containing K99. "Immunocol," an oral anti K99, highly effective vaccine has been developed, extracting the active antibodies from hyperimmune colostrum (25). I believe that this method will be applied in the future to pass on to the newborn other therapeutic agents, difficult to administer during the first few days.

11) We have entered the era of Bio-Technology and Genetic Engineering. The very first vaccine produced through these novel techniques is an anti F & M vaccine. DNA recombinations have created four anti Coli vaccines commercialized

to date. Bacterial enzyme, interferon, insulin and Growth Hormone production have been achieved. Raynaud (20) believes that by the year 2000, 60-70% of all vaccines will be produced by these methods. For that date, he foresees vaccine production increased tenfold, that of antimicrobial agents fivefold, antiparasitics fortyfold and use of anabolics increased 32fold.

Since the early 19th century, veterinary science was confined to applied research to combat the devastating infectious diseases. Research soon became more basic. Consequently, veterinary science is today at the interface between human and animal medicine, comparative and experimental medicine, genetics and biology (including molecular) and just as intensely involved in food hygiene, zootechny, agriculture, breeding and environmental research (30). At the same time, we are witnessing an ever increasing integration with public health measures, both in practice and research, in three main fields: 1) the fight against zoonoses (eradication, control and treatment); 2) food hygiene; 3) environmental protection: ecology, disposal of effluent wastes, the effects of emissions (including radioactive pollution), ethology (behavioral research) and protection of animals (30).

There is an ever growing gulf between science and the practical applicative professions. Luckily, in veterinary medicine there seems to be an ever increasing interdependence between the two. I completely agree with Professor Mayr, when he states that Animal Medicine has consistently adopted a positive attitude to the so-called "debt" owed scientific progress, and that the future of our profession is inseparably linked with the collaboration between science and practice. "For the future this means that science must subordinate itself more than ever to economic requirements; for instance, research oriented to practical applications must, along with basic research, continue to be an inalienable part of our science, since the problems of animal medicine will be solved only by ourselves and not by other disciplines" (30). The practitioner must come to terms with new scientific knowledge as well as apply and evaluate it in his professional activities. "Scientific comprehension should be aimed at, which will enable economic aspects to be compatible with professional practice" (30).

The one area in which research has been forced to a literal standstill is that of development of urgently needed new therapeutic agents. When new ones are found they do not reach the market, because the ever growing demands of the Public Health Authorities — the regulations, rules and laws — are mostly identical to those demanded for human remedies, making them uneconomical in Veterinary Medicine. The World Bank says there were 780m starving people in the World in 1980. We can not impose birth control on the DVC, nor supply the needed food to save them. We can however, help upgrade their agriculture, combat their infectious diseases and eradicate some parasitoses. DDT has helped the West eliminate a plethora of insects etc. The Tse Tse fly was almost eradicated in Africa. The West then outlawed DDT and taught the African countries its dangers. Unable to afford the expensive alternatives, these countries are now reinfested. The W.H.O. applied the same policy to Lindane (BHC), thus taking away the one cheap and effective acaricide from DVC. Bureaucratic demands have forced hundreds of pharmaceutical firms into bankruptcy or into being taken over. The large conglomerates thus created are not exactly philanthropic in nature. Veterinary specialties are simply not on their list of priorities, because of the small market, the narrow economic margin involved and the bureaucratic necessity to submit veterinary drugs to the same stringent, time consuming (at least five years) and expensive tests as human ones. Phospholipids, Vitamin B12, and some amino acids are available only through animal proteins. Without them, brain defective children are raised. Animal production can be enhanced by better nutrition or by better metabolic use of the food available. So, in 1980, on November 11th to be exact, the EEC Ministers of Agriculture, bulldozed by the gentlemen from the so-called Health Authorities of their respective countries, put a ban on the use of *all* hormones for growth promoting purposes. totally ignored scientific opinion, facts and world hunger.

It is about time someone gets their priorities right.

We are a funny breed. The more they try to hogtie us, the more we look for alternatives.

This is the scene today: We have successfully entered the field of biological and genetic engineering. Genetic mapping has started. The viral nucleic structure is being decoded. Immunising antigens. their characterization, isolation and transplantation are studied in order to build them into plasmids through genetic manipulation. Monocolonal antibody technology, facilitates characterization of micro-organisms, exact diagnosis, permitting the mass production of specific antibodies. (A year ago, four different anti-Coli vaccines, thus produced, reached the market.) The analysis of nucleic acid and the glycoprotein complex have permitted the development of new kinds of vaccines. Synthetization of these complex protein molecules will permit the preparation of purely synthetic vaccines. The development of Combination Vaccines against Multifactorial Diseases such as Enzootic Broncho-Pneumonia. Shipping Fever, Viral Cough of horses, Atrophic Rhinitis and the Kennel Cough has succeeded. A new field is the medicamental stimulation of Unspecific Defense Mechanisms. This idea led to the development of Multipotent Paramunity Inducers by Mayr, stimulating: 1) Phagocytosis; 2) Spontaneous cell-mediated Cyto-Toxicity, natural Killer Cells); 3) Stimulation, particularly of T Lymphocytes; 4) Induction of Interferon production; 5) Activation of Humoral Defense Factors (opsonins. propertins, etc.) and; 6) Interaction with certain hormones, such as Prostaglandins.

Through these new and sophisticated micro-techniques we discover ever more evidence of the relationship between human and animal microbes, mainly viruses. The discovery of new infectious agents, smaller than the smallest virus — the Viroids (infectious nuclei acids) and the Prions (small proteins) — though complicating our life even more, may have opened a door to future. more exact and specific molecular manipulation.

Our diagnostic capacity has been enormously advanced by the introduction of ELISA. micro-Elisa, R.I.A. and Immune-Electron Microscopy.

Ladies and Gentlemen, I have tried to touch lightly a few selected chapters included in the fascinating but enormous theme I was asked to present. I have also tried to remain within the confines of the time allotted. I thus had to cut even more from the already precondensed text published in the Proceedings.

To conclude:

Modern veterinary bovine practice is an increasingly sophisticated area of veterinary science, dealing with the complex problems of herd health. intensive production and environmental requirements of herds kept in large numbers, including the specific needs of the high producing animals. Bovine practice is not only concerned with health and productivity under widely differing environmental conditions, *but is deeply concerned with the welfare, nutrition, adequate housing and breeding. The veterinary surgeon is the specialist competent to deal with animal welfare and their protection. He is unselfishly dedicated to the ethical goals of protecting animal life, health and well being, the only professional capable of doing so. Medicine, health, treatment, welfare and protection of animals, is the sole province of the practicing veterinary surgeon and of veterinary science and it is the task of both government and the community to protect the welfare of animals by defending the professional freedom of the practicing veterinary surgeon (30) to act according to his best and ever increasing knowledge. The bovine practitioner, though a relatively new breed, has gained his spurs and proved that he is able to remain in the forefront of rapidly developing and changing herd production and health problems. The future of the World we leave our children may not look too bright. I am therefore honoured, proud and pleased to belong to a Professional Brotherhood that can state with a clean conscience and with facts galore as proof, that it has done and is doing its best, with outstanding results, and that it is looking into the future with optimistic confidence.*

(Graphs not included due to lack of space, Editor).

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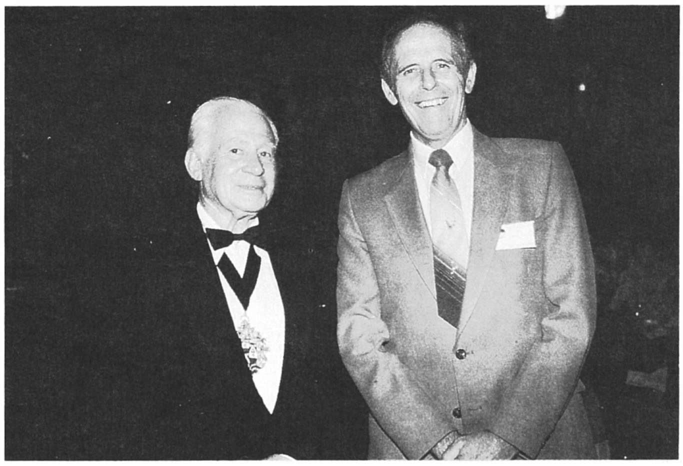
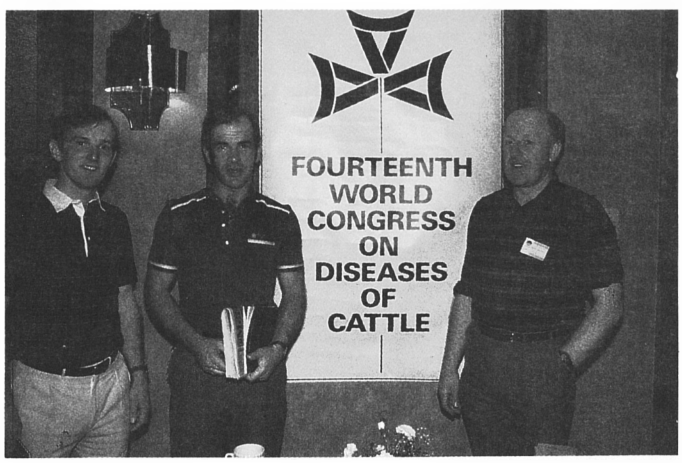
Dr. Espinasse (President) presenting Dr. Amstutz (Past President) with a Medal of Honor. Dr. Stober, left, continues as Secretary-Treasurer.



The Mayor of Durban with Dr. Robert Phillips, Fort Collins, Colorado who will be the first veterinarian astronaut.



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-NOTES-

Lutalyse® Sterile Solution
(dinoprost tromethamine)

2-8-83

VETERINARY – For intramuscular use in cattle when regression of the corpus luteum is desired. This includes estrus synchronization, treatment of unobserved (silent) estrus and abortion of feedlot and other non-lactating cattle.

INDICATIONS AND INSTRUCTIONS FOR USE

Lutalyse (dinoprost tromethamine) sterile solution is indicated as a luteolytic agent.

Lutalyse is effective only in those cattle having a corpus luteum, i.e., those which ovulated at least five days prior to treatment. Future reproductive performance of animals that are not cycling will be unaffected by *Lutalyse* injection.

1. For Intramuscular Use for Estrus Synchronization in Beef Cattle and Non-Lactating Dairy Heifers. *Lutalyse* is used to control the timing of estrus and ovulation in estrus cycling cattle that have a corpus luteum.

Inject a dose of 5 ml *Lutalyse* (25 mg $PGF_{2\alpha}$) intramuscularly either once or twice at a 10 to 12 day interval.

With the single injection, cattle should be bred at the usual time relative to estrus.

With the two injections cattle can be bred after the second injection either at the usual time relative to detected estrus or at about 80 hours after the second *Lutalyse* injection.

Estrus is expected to occur 1 to 5 days after injection if a corpus luteum was present. Cattle that do not become pregnant to breeding at estrus on days 1 to 5 after injection will be expected to return to estrus in about 18 to 24 days.

2. For Intramuscular Use for Unobserved (Silent) Estrus in Lactating Dairy Cows with a Corpus Luteum. Inject a dose of 5 ml *Lutalyse* (25 mg $PGF_{2\alpha}$) intramuscularly. Breed cows as they are detected in estrus. If estrus has not been observed by 80 hours after injection, breed at 80 hours. If the cow returns to estrus breed at the usual time relative to estrus.

3. For Intramuscular Use for Abortion of Feedlot and Other Non-Lactating Cattle. *Lutalyse* is indicated for its abortifacient effect in feedlot and other non-lactating cattle during the first 100 days of gestation. Inject a dose of 25 mg intramuscularly. Cattle that abort will abort within 35 days of injection.

WARNINGS

Not for human use.

Women of child-bearing age, asthmatics, and persons with bronchial and other respiratory problems should exercise **extreme caution** when handling this product. In the early stages, women may be unaware of their pregnancies. Dinoprost tromethamine is readily absorbed through the skin and can cause abortion and/or bronchiospasms. Direct contact with the skin should, therefore, be avoided. Accidental spillage on the skin should be washed off **immediately** with soap and water.

Use of this product in excess of the approved dose may result in drug residues.

PRECAUTIONS

Do not administer to pregnant cattle unless abortion is desired.

Do not administer intravenously (I.V.), as this route might potentiate adverse reactions.

Cattle administered a progestogen would be expected to have a reduced response to *Lutalyse*.

Aggressive antibiotic therapy should be employed at the first sign of infection at the injection site whether localized or diffuse. As with all parenteral products careful aseptic techniques should be employed to decrease the possibility of post injection bacterial infections.

ADVERSE REACTIONS

1. The most frequently observed side effect is increased rectal temperature at a 5x or 10x overdose. However, rectal temperature change has been transient in all cases observed and has not been detrimental to the animal.
2. Limited salivation has been reported in some instances.
3. Intravenous administration might increase heart rate.
4. Localized post injection bacterial infections that may become generalized have been reported. In rare instances such infections have terminated fatally. See PRECAUTIONS.

IMPORTANT

No milk discard or preslaughter drug withdrawal period is required for labeled uses.

DOSAGE AND ADMINISTRATION

Lutalyse is supplied at a concentration of 5 mg dinoprost per ml. *Lutalyse* is luteolytic in cattle at 25 mg (5 ml) administered intramuscularly. As with any multidose vial, practice aseptic techniques in withdrawing each dose. Adequately clean and disinfect the vial closure prior to entry with a sterile needle.

HOW SUPPLIED

Lutalyse Sterile Solution is available in 10 and 30 ml vials.

Caution: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

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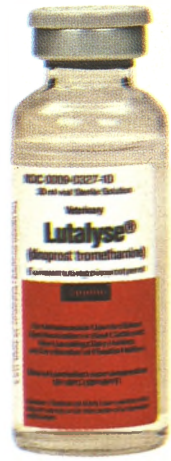

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Efficacy Effectively removes all common gastrointestinal nematodes and lungworms.

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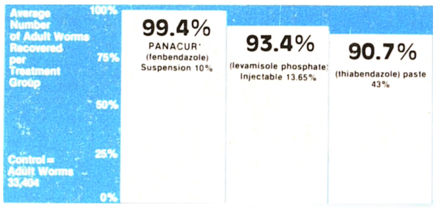
A Controlled Critical Study Comparing Efficacy of Three Anthelmintics in Naturally Infected Cattle

Efficacy results, total adult worm burden*



*Data on file

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Available only to licensed Veterinarians

Panacur* (fenbendazole) Cattle Dewormer
Suspension 10% (100 mg/ml)

DIRECTIONS: Determine the proper dose according to estimated body weight. Administer orally.

DOSAGE: Cattle-5 mg/kg (2.3 mg/lb) for the removal and control of—Lungworm: (*Dictyocaulus viviparus*); Stomach worms: Barberpole worm (*Haemonchus contortus*), Brown stomach worm (*Ostertagia ostertagi*), Small stomach worm (*Trichostrongylus axei*); Intestinal worms: Hookworm (*Bunostomum phlebotomum*), Thread-necked intestinal worm (*Nematodirus helvetianus*), Small intestinal worms,(*Cooperia punctata & C. oncophora*), Bankrupt worm (*Trichostrongylus colubriformis*), Nodular worm (*Oesophagostomum radiatum*). The recommended dose of 5 mg/kg is achieved when 2.3 mL of the drug is given for each 100 lb. body weight.

EXAMPLES:	Dose	Cattle Weight	Dose	Cattle Weight
	2.5 mL	109 lb.	15.0 mL	652 lb.
	5.0 mL	217 lb.	23.0 mL	1,000 lb.
	10.0 mL	435 lb.		

Under conditions of continued exposure to parasites, retreatment may be needed after 4-6 weeks. There are no known contraindications to the use of the drug in cattle.

WARNING: Cattle must not be slaughtered within 8 days following last treatment. Because a withdrawal time in milk has not been established, do not use in dairy cattle of breeding age.

CAUTION: Consult your veterinarian for assistance in diagnosis, treatment and control of parasitism.

Sales to licensed veterinarians only.

Keep this and all medication out of the reach of children.

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