The Significance of Veterinary Science in the National Economy

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(*Read before the Society on March 2nd*, 1956)

Introduction

I propose to go into the economic significance of veterinary science in the Republic of Ireland and to relate the evidence to the year 1954

The most significant figures I have arrived at are derived from the returns on livestock of the Central Statistics Office As a matter of fact it was only when I came across a copy of the Statistical Abstract some years ago and then went tracing the causes for the differences between one age group of cattle and another in the same and in subsequent years that I began to appreciate the significance of animal disease in the economics of this country and the place of the veterinarian in our economic set up I will probably be accused *a priori* of placing undue trust in statistics and statisticians From my experience they seem to be mistrusted people I did not trust them either until I got to know them and appreciate within the limits of my understanding the outstanding value of their work compiled with such extreme care I am happy to declare myself their disciple, and I wish to take this opportunity to express my appreciation of the work of the Central Statistics Office, and my thanks to Dr Geary and his staff for the help given to me on many occasions

Losses described

If the country is taken as a unit the loss caused by disease can be defined as the increased net saleable output that would have been produced if disease had been eliminated In view of our existing surpluses of meat products extra production is only of value when it reaches the export market For example where extra calves are saved in Munster the farmers there can market them immediately at £10–£15 each, but the country as it manages the industry has no market for them as we now farm until they are two years old

Very often a farmer may lose ten out of a hundred lambs from internal worms The carcases of the ten dead lambs may have weighed 500 lb The ninety remaining lambs may be doing fairly well There is no doubt that these 90 have worms also but not enough to kill them It is certain that their carcases when slaughtered will be around 900 lb or more, less than they would have been if free of worms which loss equals the carcases of 15 sheep weighing 60 lb each Yet all the fuss is about the ten which died

The above descriptions are given in preparation for what is to follow

Veterinary Activities

Veterinary Surgeons employed by the Department of Agriculture are chiefly engaged in the inspection of animals and meat products for export for the purpose of maintaining a high standard of health and to meet the requirements of importing countries Mainly in an advisory and administrative capacity there is considerable activity in preventing the introduction of disease No animal product or any article or person capable of introducing a dangerous animal disease is admitted into the country without quarantine (in the exporting country), licence or inspection as they case may be Such imports are allowed in only in the national interest and subject to such safeguards as possible to insure that they do not introduce disease

These precautions have been taken over a great many years and as necessit arises further precautions are taken We are justly proud of the success of these precautions We are free from all the major epidemic diseases causing considerable losses in Great Britain and the continent of Europe We have had only one major outbreak of foot and mouth disease in over forty years (that was in 1941), we are free from swine fever for fifteen years We have had only one minor outbreak of fowl pest Rabies is unknown for over fifty years

TABLE 1

Animal diseases—Ireland (32 counties)

Disease	Year	Outbreaks	Number of Animals		Died	Animals affected
			Affected	Slaughtered		
Pleuro pneumonia	1878	1,365	2,755	2,612	143	Cattle
Foot and mouth disease	1883	3,510	114,502	—	—	Ruminants and swine
Swine fever	1884	7,619	n a	36,062	3,006	Swine
Anthrax	1891	29	69	—	—	All animals
Glanders	1879	43	n a	—	—	Horses
Rabies	1894	779	n a	689	90	All animals
Sheep scab	1893	1,002	10,358	—	—	Sheep
Parasitic mange	1903	195	295	—	—	Horses

n a =not available

TABLE 2

Animals affected by Foot and Mouth Disease—Ireland (26 counties)

Embargo placed 20th January, 1941 completely removed 24th November, 1941

Number of outbreaks 556

Category	Cattle	Sheep	Pigs	Goats
Number diseased	5,912	143	199	—
Number slaughtered	27,942	10,187	3,310	608
Number salvaged	3,471	857	983	5

Compensation paid £450,644, Salvage £39,681, net loss £410,963

TABLE 3

Foul Pest, 1950—*Ireland* (26 *counties*)

				£
No of outbreaks	14	Compensation paid	Live Birds	936
Flocks destroyed	71	,, ,,	Chicks	2,770
Birds slaughtered	1,235	, ,	Poultry carcases	4 991
Day old chicks	40,202	,, ,,	Feathers	138
Poultry carcases	45,694		TOTAL	8,835

TABLE 4

Foot and Mouth Disease and Fowl Pest—Great Britain

Stock slaughtered and Compensation paid

Foot and Mouth Disease	1952		1953		1954	
	Number	Compensation	Number	Compensation	Number	Compensation
		£		£		£
Cattle	32,274	1 951 000	1 211	63,573	527	32,145
Sheep	32,346	283 333	5 222	46 658	377	3,395
Pigs	10,825	161,871	1,286	19,592	391	5,528
Goats	67	519	1	5	—	—
TOTALS	75,512	2,396,723	7,720	129 828	1,295	41 068
Fowl Pest	322,645	340,243	597 362	465 901	531 066	465,648

TABLE 5

Extract from "Iris Oifigiuil"—January 17th, 1956

Diseases of Animals Act

Disease	Outbreaks	Animals attacked
Sheep scab	53 (1955)	1,015
Bovine tuberculosis	945 (1955)	946
Anthrax	4 (1954)	15 (10 dogs)
Dourine	Never occurred	
Sheep pox	Not occurred since	1850
Rinderpest	,, ,, ,	1877
Pleuro pneumonia	,, ,	1892
Rabies	,, ,, ,,	1903
Epizootic lymphangitis	,, ,,	1906

Disease	Outbreaks
Glanders	Not occurred since 1920
Parasitic mange	,, ,, ,, 1936
Swine fever	, ,, , 1939
Foot and mouth disease	,, ,, ,, 1941
,	Last previous outbreak 1928
Fowl pest	Not occurred since 1950 the only outbreak ever

Anthrax is a rare occurrence We are free or almost free of other less spectacular but economically serious diseases prevalent in the rest of Europe There is no doubt whatever that veterinary activity has eradicated many devastating diseases prevalent in the past It is also

quite certain that if the present controls were dropped havoc would be caused by the diseases introduced This is particularly true considering the constant approaches made to import livestock products from countries where epidemic diseases are prevalent

It is impossible to assess the economic significance of these precautions The outbreak of Foot and Mouth disease in 1941 cost £411,000 in compensation alone for animals slaughtered, the cost to-day would be about three times that No account was taken in 1941 of consequential losses and of the huge losses due to the long embargo on export The minor outbreak of fowl pest in 1950 cost over £8,000 in compensation for poultry, poultry carcases and feathers destroyed The disease was confirmed in only fourteen premises A major result of our freedom from major epidemic diseases is that our animals and livestock products are on this score free to enter any country If these dangerous diseases now eradicated were to be introduced again and became endemic the losses would go into very many millions per annum

Investigations, limited by the availability of staff are carried out when a district or a farmer has serious losses These investigations have in recent years resulted in most important findings Investigations in Loop Head, Clare, in 1948, led to the campaign since then against worms and fluke in cattle which has saved the lives of probably over a quarter of a million calves Investigation in Co Limerick within the past few years has led to the discovery of the method of preventing white scour in calves The application of this method opens the way to saving the lives of about 50,000 calves per annum Investigations are now going on in Loop Head and Whiddy Island in regard to warbles in cattle which cause such damage to hides

Losses from Disease

These losses are related to the year 1954

Losses in Calves We call cattle calves until they are yearlings After this age they have got over the worst of their troubles until they become cows when the troubles begin again The losses in calves are set out to be

(*a*) calves lost because of barren cows which failed to conceive, calves which were aborted dead or dying, still-born calves at full term,

(*b*) calves that died during the first few months after birth,

(*c*) other calves which died before being enumerated in the 1–2 year old group in the annual census

Losses in all these calves is estimated by taking the number of calves which could have been born, in a year, the number which survived to enter the 1–2 years group in the subsequent year, and taking the difference With rare exceptions farmers aim to have cows calving once a year Possible calves born is calculated by adding to the number of cows 2 per cent for twins

To estimate the possible calves born we attribute to the cows recorded in June all the calves possibly born in the previous year In fact in any year (June/May following) some thousands of calves are attributed to cows already dead or exported and not enumerated, and many cows recorded in June have not produced a calf in the

preceding year It would be impossible to make adjustments for the many factors known and unknown I am encouraged to believe that this method of calculation will not give too many calves for the 1953/54 possible crop, or the calves lost, for the following season

I have taken the years 1944–'55 and taken averages of the years 1944–1954, 1944–1949, 1950–1954 The average of calves possibly born for the periods were 1,209,000, 1,208,000, 1,210,000 The constancy of the number of possible calves born is striking for these averages In the year 1954 possible calves born from 1,204,000 cows numbered 1,228,000 , for June, 1955, the tentative figures for yearlings (1–2 years) is 1,024,000 Allowing 6,000 for healthy calves slaughtered added to the 1,024,000 making 1,032,000, lost calves come to 198,000 which works out at 16 1 per cent

TABLE 6

1954/55 *Calf losses against possible Calves born*

Number of cows June, 1954	1,204,000
Possible calves born 53/54	1,228,000
Yearlings (1–2 yrs), 1955	1,024,000
Calves slaughtered	6,000
Nett calves up to 1 yr lost through disease and abnormality	198,000
Percentage of possible calves lost	16 1%

Thus for the cows in 1954—198,000 calves are lost In that year 609,000 fat cattle and stores were exported valued at £30,064,000 making an average of £50 each Valued at £50 each, say, 200,000 calves are worth £10,000,000 which would be realised for them during the subsequent years in the absence of disease

Assuming they all lived, that they would all go for export eventually, that they would be spread out over the different age group as at present and that in subsequent years 200,000 extra calves would be saved, there would eventually be 650,000 extra cattle to carry on the land I estimate that the feeding of them would be equal to about 450,000 adult cattle I make out all cattle, sheep and horses to be equivalent to around 4,500,000 adult cattle units Thus to carry the extra cattle 10 per cent more feeding would be necessary This extra feeding could be provided by home-produced food by importing extra fertiliser, seeds perhaps, and other incidentals According to the return for 1948 to 1953 our biggest import of fertilisers in any one year was £3,785,000 Let us say another £2,000,000 worth of fertilisers would suffice for the extra cattle which would leave the net annual export value at £8,000,000, for the extra calves born and living to be exported

Losses in Cows, 1954 Table 7 shows how cows were disposed of in the year 1954 It is estimated that 196,152 cows left the herds Only the figures for cows consumed at home and cows which died are estimated It can be taken that only springers and milch cows exported were fully economic The others were removed for old age only, old age plus disease, disease or uneconomic only A cow disposed of is replaced by a heifer which otherwise would have been exported The

loss is the difference between what the cow disposed of realised, and the beef value of the heifer which is put at £50

TABLE 7

Disposal of Cows 1954

Live exports		Value per head	Cost of replacement at £50 per heifer exportable
Springers 2,380			
Milch cows 4 990	7,370		
Fat cows	14,119		
Store and stripper cows	4,263		
TOTAL	25,752	£50	Nil
Cows slaughtered for export			
Classification A	81,200	£30	£1 624,000
,, B	31,200	£40	£312,000
TOTAL	112,400		
Home consumption (Estimate)	40,000	£40	£400,000
Died (1 5%)	18,000	£1	£882,000
TOTAL disposals	196,152		
Abattoir condemnation of cows slaughtered	(152,400)		£300,000
Deduction for cost of replacing 100,000 cows disposed of for old age value £30 each			£3,518,000 −2,000,000
			£1,518 000 nett cost

TABLE 7A

Primary Causes for Disposals

Category	Number	Percentage of disposals	Percentage of all cows
Dairy cow trade	7 000	3 7	0 5
Old age	100,000	51 0	8 5
Death	18,000	9 3	1 5
Mastitis	30,000	16 0	2 5
Infertility	41,000	20 0	3 5
	196,000	100 0	16 5

Note Cows may be removed (except trade) for any combination of old age, mastitis and infertility, for any two of them or for one singly Interspersed through all is debility tuberculosis and other causes

At the values given for cows in the different categories the replacement loss is the difference between cow and export heifer values, and the gross is £3,518,000 An estimate is given of 100,000 for cows which because of old age and old age plus disease were uneconomic and had to be removed regardless of disease Since old age and its consequences is normal and the cow population must be maintained, at least 100,000 heifers to replace old cows were not for sale Therefore offsetting the

figure of £2,000,000 for these heifers, the cost of replacement is £1½ million The figure for cows consumed at home is regarded as reasonable being one in four of cattle slaughtered for home consumption Recent British surveys give cow mortality at a little over 2 per cent , pre-war figures collected here give about the same percentage From experience of the many abattoirs here a lower figure seems reasonable and thus 1 5 per cent is chosen To the above loss must be added a further £300,000 for abattoir condemnation among these cows making a net of £1,518,000 for cow replacement The above estimates are made on what is believed to have actually happened If, however, disease were eliminated a cow should milk and breed for ten lactations making the replacement rate one in ten instead of the present rate, about one in six Thus for 1,204,000 cows there would be only 120,000 replacements annually, against the present figure around 200,000 leaving 80,000 more heifers for export

Losses in other cattle The losses estimated so far are for calves and replacement of cows There remains the other cattle, except cows, which in 1954 came to 2,264,000 The calves recorded in June, under one year old and checked again in the following year in the 1–2 year old group have shown a mortality of 0 6 per cent in 1950/51 , 2 4 per cent in 1951/52 , 0 6 per cent in 1952/53 , 0 7 per cent in 1953/54, and 1 per cent in 1954/55 (Table 18) Bearing in mind the survival rate of those calves which are more susceptible to disease than the older group according to our experience, we consider that the mortality rate for the older cattle (except cows) should be about 0 5 per cent Therefore it is estimated that 11,320 died, that is cattle over one year old except cows Valuing these at £50 each the figure comes to £566,000

Total losses in cattle Under the three headings dealt with so far the potential and actual values of the cattle are set out These come to £8,000,000 for the drop in calves up to one year old, to £1,518,000 for the replacement of cows and to £566,000 for mortality in other cattle, making a total of £10,084,000 which is accounted for by 200,000 missing calves, 18,000 cows and 11,000 other cattle, making a total of 229 000 cattle

Losses in Cattle Products These losses are intended to be those due to decreased output of the animal due to disease With the multiplicity of diseases and abnormal conditions only the major diseases are considered

Internal Parasites

Mortality is essentially confined to calves under one year although in individual farms older animals may die Mortality from parasites in calves is estimated by taking the drop in calves recorded in June, when they are recorded again in the next June at 1–2 years old Having allowed for calves slaughtered for veal we believe that prior to 1949/50 about 90 per cent of deaths were due to these parasites It is thus estimated that from 1939 to 1948 (Table 18) an average of 66,000 (7 per cent) calves died annually from parasites Since 1950 annual mortality from all causes in this group is under 10,000 (1 per cent) effecting a saving of 50,000 yearlings per annum

As a result of an SOS in the autumn of 1948 the Minister for Agriculture sent veterinary staff to Loop Head in Clare They found that 950 cattle, mostly calves, had died the previous year, the epidemic was still on and the cause was diagnosed to be round worms and fluke Treatment was offered to all farmers in the area, and all but the small number of Thomases (soon converted) accepted treatment In that season only six calves died among the farmers accepting treatment Credit for this spectacular result goes to the now famous drugs Phenothiazine for the round worms and Hexachloroethane for the fluke, the consumption of which two has gone up 50-fold with the saving since 1949 of 50,000 calves annually for £60,000 to £70,000 worth of the imported drugs The amount imported is equivalent to up to 16,000,000 doses administered to cattle, sheep and some horses

An outstanding feature of these drugs is their safety, in that only the rare animal with some individual idiosyncrasy will succumb to the dosing necessary to deal with the parasites It was observed in Clare that the treatment as well as saving the lives of the younger stock greatly improved the health and output of the older ones, including cows In 1954, 280,000 bullocks, heifers and bulls were slaughtered in the abattoirs and slaughter houses, as well as 150,000 cows, 12 per cent —33,000 livers of bullocks, heifers and bulls were condemned for fluke and 70 per cent —105,000 of cows' livers (Table 8) The value of good quality livers in this export market in 1954 was around 35/– each, at this price the 140,000 livers would be worth say £200,000, up to £60,000 for the livers of the young cattle

TABLE 8

Losses in Milk and Meat from Internal Parasites

Category	Number	Livers con demned	Value
Bulls, bullocks, heifers slaughtered	280,000	33,000	
Cows slaughtered	150,000	105,000	£
	430,000	138,000	200,000
Cows in herds affected with fluke	600 000		
Loss of milk at 12 13 galls per cow 7½ ml galls per annum			750,000
Cattle exported and/or slaughtered (1954)	1,038,000		
Live weight loss through parasites at 2 stone per beast	cwt 260,000		1,300,000
Total loss meat and milk			2,250,000

With 70 per cent of badly affected livers among the cows slaughtered which are the older cows we may expect up to 50 per cent of all cows to carry enough of fluke (150, or more) to hinder their output of milk and meat, that is 600,000 cows in 1954 The very minimum loss would be 12 to 13 gallons per cow, that is 7,500,000 gallons of milk which I value at 2/– per gallon (1/7 for the fat and 5d for the skim to produce pork at 240/– per cwt) comes to £750,000 per annum The vast

majority of cows have a credit balance for round worms and the loss of milk would be much less than for fluke There is no means known of splitting up between fluke and round worms, the loss in meat, when an animal is affected with both

Experiments have shown that grazed in the same class of pasture for six months lambs free from fluke and round worms weighed 1½ stone more than their half twins which externally seemed quite healthy but were carrying a not excessive load of round worms

The output of cattle in 1954 numbered 1,038,000 made up of 180,000 cows, and 858,000 young cattle Seventy per cent of the cows—120,000, and 12 per cent of the other cattle—103,000 had badly affected livers and many more had some fluke , they all had round worms to some degree Based on the sheep experiments they lost at the very least 2 stone each—most probably much more At 2 stone each the 1,038,000 cattle lost 260,000 cwt live-weight which at £5 per cwt was worth £1,300,000 I would therefore put the minimum loss in milk and beef down to internal parasites as £2,300,000

Mastitis in Cows

In the abattoirs here almost 20 per cent of the cows slaughtered, on naked eye examination and palpation of the udder, have established mastitis in one or more quarters, many of the cows chiefly the younger ones are removed, because of this alone Large numbers of cows removed for old age have it also Since this is what may be called a long term disease because in the mild or chronic form the cows are in the herds for months or years while the disease progresses and for months before it is even noticed Also because in the acute cases if the cow survives and is milking from the healthy quarters she is kept on at least until near the end of the lactation and in many cases if only one quarter is affected and it would cost a lot to replace her she is kept on for one or more further lactations Thus from the nature of this disease it may be concluded from the abattoir findings that the disease causes very significant losses

TABLE 9

Lactation	British Herd		Cows removed from herd after season	Irish Herd	Cows removed from herd at end of season
	Percentage of cows in each lactation			Percentage of cows in each lactation	
	1950/51	1951/52	1950/51		
1st	27 3	29 1	5 9	16	2
2nd	22 5	21 4	5 9	14	1
3rd	16 4	16 6	4 4	13	0
4th	11 4	12 0	4 0	13	1
5th	8 2	7 4	2 4	12	1
6th	5 6	5 8	6 5	11	2
7th or over	8 6	7 7		21	9
TOTAL	100	100	29 1	100	16

TABLE 10

Incidence of Clinical Mastitis according to lactation

Lactation	British Herd	Irish Herd (based on English herd incidence)		
	Percentage Mastitis	No of cows	Percentage Mastitis	No of Mastitis Cows
1st	2 6	192	2 6	5 000
2nd	3 9	168	3 9	6,500
3rd	6 3	156	6 3	9 600
4th	9 5	156	9 5	15,600
5th	11 2	144	11 2	16 100
6th	15 8	132	15 8	20,200
7th or over	18 7	252	18 7	42,000

	British Herd	Irish Herd
Total cows examined	8,418	1 200,000
Affected with mastitis	633	120,000
Incidence	7 5%	10%

Table 9 shows the age groupings of cows in English herds with 27 per cent to 29 per cent in calf heifers added each year The Table also shows how the age groups may be here based on 16 per cent first calf heifers added each year which figure is based on the disposal of cows (Table 7A) In Table 10 is shown the total incidence of clinical mastitis in Great Britain showing how it progresses with age On this basis and on our own findings our herds should be more badly affected On the other hand as with other contagious diseases, the bigger the herd the higher the incidence, on this score we may expect to fare better, but I would say that age is the more weighty factor In the Table 10 the age factor for clinical mastitis in English herds is taken with the estimated age groupings and it works out at 10 per cent of clinical mastitis here being actually 120,000 cows There is also another factor to be taken into account, that is, the higher incidence and overall losses in bigger herds In England, the farmers there like the big dairy farmers here are using more antibiotics and are keeping down the amount of clinical mastitis

Taking all the available information and estimates into account it would seem that our position here is rather similar to that in Great Britain In a recent British survey the percentages for clinical mastitis were 7 1 per cent, 6 4 per cent and 9 8 per cent for the years 1950/51, 1951/52 and 1952/53 respectively As already said, a cow may have the disease without observable clinical signs Recent and earlier observations indicate that 25–30 per cent of cows are affected to some degree, minute or great

In a Report in 1941 the British Veterinary Association estimated that all the forms of mastitis caused an average drop of 60 gallons per lactation

Taking the lesser figure of 25 per cent of cows affected here and because of our lesser yields, say a loss of 50 gallons per affected cow, we get a loss of 15,000,000 gallons for 300,000 cows which at 2/-- per gallon is worth £1,500,000 I have already covered under herd replacement the loss for deaths and disposals due to mastitis

Infertility in Cows and Mortality in Young Calves

Under these two headings we are limited between two firm figures in the statistical returns, namely, the cows and the yearlings (1–2 years)

in the following year In 1953 there were 1,174,000 cows which earlier could have given birth to 1,197,000 live calves (2 per cent added to numbers of cows for twins) In 1954 there were 989,000 yearlings making a drop of 208,000 but allowing for calves slaughtered the net figure is 200,000 yearlings missing because of disease and other abnormalities There is a drop of 9,000 between calves recorded in June, 1953, and yearlings in 1954 leaving 190,000 calves to be accounted for between infertility in cows and mortality in young calves

Infertility in Cows The straight evidence for this infertility is derived from the number of cows recorded in June and the number of calves born in the previous 12 months Figures have been obtained for the number of calves born in 1952/3 county by county These figures were examined and checked against the number of calves under one year recorded county by county in June, 1953 If there was no mortality the figures should correspond The figures were Born 1,112,132 calves in June, 1952–May 31st, 1953 and for June, 1953, calves under one year 998,112, leaving a deficit of 114,010 When comparing for each county, births, survivals and the number of cows it was seen that in all counties except three of those outside Munster, there were more calves in June, 1953, than there were calves born in the previous 12 months, making an excess of 9,000 in June, 1953, in the 3 provinces outside Munster On the other hand, there was a deficit of 122,000 calves born in Munster One county outside Munster attributed 103 calves to every 100 cows Several others went very close on 100 per cent It was quite clear that calves born in Munster were being claimed for the other provinces and were being counted twice After various considerations it was decided to reduce the number given for calves born by 35,000 to give the figure of 1,077,000 instead of 1,112,000 for 1,174,000 cows Allowing 2 per cent for twins, these figures work out at 118,000 cows infertile or 10 per cent of the cows and 120,000 calves missing or 10 per cent of the possible calves It is also from the number of calves born that one can work out mortality in calves under around 6 months old by deducting the June, 1953 calves under one year from the calves born and allowing for calves slaughtered for veal In order to check the validity of the 10 per cent above it was necessary to consider evidence in relation to barren cows, abortion stillbirths and mortality in calves under 6 months old

TABLE 11

Herd surveys— Incidence of disease

Survey	Barren cows	Abortion	Stillbirth
	%	%	%
Cork Limerick, 1937/8	4 6	3 2	—
,, 1942/3	7 0(*a*)	—	—
West Cork, 1941/2	8 2	0 8	—
A I centre Kerry, 1953/4	7 0(*a*)	—	—
Great Britain (Withers), 1945/48	—	1 2	5 3
,, ,, (Lovell and Hill), 1936/7	—	5 5	4 2
,, ,, (M of Agric), 1950/52	—	2 5	4 5
,, , (Brit Vet Ass), 1940	7 5 (*a*)	—	—

(*a*) Includes Abortion and Stillbirths

The monthly calving in the figures obtained for births in 1950/51 were checked month by month against inseminations from the artificial insemination of 115,000 cows in 1953 The years were not the same but the trends are It will be seen from those that the calvings (estimated from first inseminations) are almost the same for the February May period The difference in the June-September period is explained by the fact that a considerable number of the A I calvings are to meet the Dublin milk trade We have not a direct explanation for the October-January figures The A I figures are a pointer in favour of accepting the birth returns obtained

TABLE 12

Calving returns compared with returns from A I centres

Period	Percentage of total calvings	
	Natural matings	Artificial Insemination
February May	74 7	75 0
June September	8 8	12 7
October January	16 5	12 3
	100 0	100 0

At the A I centre in Kerry, 9,000 inseminations in 1953/54 and 15,000 in 1954/55 were followed up and it was found that 93 per cent of cows produced a live calf This is a figure of 7 per cent of cows which may have been barren and/or may have aborted or may have given birth to a still-born calf In the survey the abortions were under 1 per cent (Table 11)

TABLE 13

Great Britain—Calf mortality

Category	F W Withers' Survey 1946/48	Lovell and Hill Survey, 1936/37	
		Great Britain	Scotland
	%	%	%
Calves aborted	1 2	5 5	5 2
Calves stillborn	5 3	4 2	2 9
Calves died—within six months of birth	7 4	5 5	11 4
do —Dairy herds	8 3		
do —Beef herds	4 6		
Total calves lost	13 9	15 4	19 5

In a comprehensive survey in Great Britain (Table 13) during the years 1946–47 and '48 carried out by F W Withers, a Veterinary Officer of the British Minister for Agriculture, covering the births of

calves and mortality of calves up to six months old, there was 1 2 per cent of abortions and 5 3 per cent of stillbirths—6 5 per cent in all In a similar survey of Lovell & Hill in 1936 and 1937 the overall figure was 9 7 per cent with 5 5 per cent for abortion and 4 2 per cent for stillbirths In a survey carried out by the British Ministry of Agriculture in 1950/51 and 1951/52 there were 2 5 per cent of abortions and 4 5 per cent of stillbirths—7 per cent in all

From observations made at abattoirs here in 1954 at least 90 per cent of cows slaughtered were not in-calf and the same can be said of dry cows exported They numbered 171,000—90 per cent of which is 154,000 Between August and December about 110,000 cows were disposed of, the great majority of which were kept to milk in the herd during the previous season, probably calved normally, and were either barren or were not mated Of the remaining 61,000—95 per cent were barren and were disposed of between January and July These 58,000 barren cows were probably genuinely barren for the most part or had aborted, the others having calved normally

TABLE 14

Calf losses Cork and Limerick (M Murphy, M A , B Comm)

Category	Limerick Cork area				West Cork
	1937/38	1938/39	1939/40	1942/43	1940/41
	%	%	%	%	%
Cows not in calf	4 6	—	—	7	8 5
Cows aborted	3 2	—	—		0 8
Live calves died	32	23	22	24	22

TABLE 15

White Scour Experiments—W Limerick—T Murphy, M Sc , M P C V S.

Category	1952	Calves given Aurofac A		Calves given Streptomycin 1954
		1953	1954	
	%	%	%	%
Calves affected with white scour	40 7	4 3	4 7	15
Calves died of white scour	17 1	1 0	2 2	0 6

Professor Michael Murphy in his surveys in Cork and Limerick got 4 6 per cent for barren cows and 3 2 per cent for abortion in 1937/38 In 1942/43 the total figure was 7 per cent , while in West Cork, 1940/41

8 5 per cent of cows were barren and 0 8 per cent aborted Barren here means cows which did not produce a calf in the year of survey

It was estimated by the British Veterinary Association in 1940 that 7½ per cent of the cows kept in the herds failed to produce a calf because of being temporarily barren or sterile At that time the cow stocks were being built up, the price of cow beef was kept low and it seems probable that many such cows were kept on which should normally be disposed of

From the figures collected and set up in Table 11, the task of reconciling all of them is beyond me I think it is fairly certain that the drop from 5 5 per cent in Britain is to be accepted because of the widespread use of the Strain 19 vaccine against contagious abortion The Ministry of Agriculture's figure of 2 5 per cent is the more acceptable as it covered 162 herds and 5,000 cows against 44 herds and 2,800 cows in the Withers survey with 1 2 per cent The 3 2 per cent in Cork/Limerick is now bound to be reduced because the S 19 vaccine has been availed of quite well in the area and also because we are satisfied that abortion is no longer the problem it was We are probably no worse than Britain and therefore I put forward the figure of 2 5 *per cent for abortion* I am not taking into account barren cows which calved and milked normally and were disposed of at the end of lactation, the only loss in their case being the cost of replacement which is already covered In the Table barren means cows kept in the herds which did not calve within a twelve month period while in the herds I believe the figure for Cork/Limerick can be reduced to 4 0 per cent because of the improvement in abortion This figure can probably hold for Munster and most of Leinster, but from experience we believe that it must be doubled for Connacht and Ulster, largely because of the very considerable delay in getting cows in-calf, making an average for the country of *about* 5 *per cent* We have very little information on stillbirths here Judging from the reactions of farmers it is not a problem and not worse than the present rate of abortion, and therefore I am inclined to accept much below the English figure and *say* 2 5 *per cent* The total under all these headings of barren, abortion and stillbirths comes to 10 per cent From the economic point of view I have already covered the losses in calves and the losses for replacement of cows due to these conditions to my satisfaction from the available evidence My concern in going to such rounds with much varied evidence is to assess the loss in milk due to abortions and barren cows

In the British surveys 60 per cent to 70 per cent of abortions occurred at the eighth month of pregnancy and about 35 per cent before the sixth month British estimates which are claimed to be reliable affirm that abortions around eight months cause a loss of 25 per cent of milk, but earlier abortions may cause a drop of 50 per cent Taking the lowest figure of 25 per cent and 400 gallons per cow this gives an average drop here of 100 gallons worth £10 With 2 5 per cent abortions the figure for 1,200,000 cows is 30,000 giving a loss of £300,000 for 3,000,000 gallons of milk

In the British surveys a figure of $\frac{1}{15}$ of yield was worked out as the loss for barren cows which at 90 gallons per cow was worth £9 With the estimated 5 per cent there are 60,000 barren cows here which bring the loss to £540,000 for 5½ million gallons of milk

TABLE 16

Calves lost because of barren cows, abortions and stillbirths

(1) Cows June, 1954	1,204,000
(2) Possible calves born 53/54	1,228,000
(3) Calves born 53/54	1,105 000
(4) Calves missing	123,000
(5) Percentage calves missing	10%

NOTE Possible calves estimated by adding 2 per cent for twins to number of cows

From the above 10 per cent i e 123,000 of the 1,228,000 possible calves in 1953/54 were lost leaving 1,105,000 actually born alive and 10 per cent of cows—120,000 failing to produce a live calf

Whether it was by accident, design or statistics, the figures and conclusions above fit in with the figures which I was given for calf births in 1952/3, and which I amended and applied to the year 1953/54

Mortality in young calves

TABLE 17

Mortality in Young Calves, 1953/54

	No
Calves born (June May 31st, 1953 1954)	1,105,000
Calves under 1 year, June, 1954	1,037,000
Calves slaughtered	3,000
Calves died	65,000
Percentage mortality	6%

Taking the figure of 1,105,000 calves born in 1953/54 and 1,037,000 recorded calves in June, 1954, there is a drop of 68,000 of which say 3,000 were slaughtered leaving 65 000 dead—6 per cent of calves born and 5 per cent of calves possibly born The vast majority of calves are born from January to May By far the greatest mortality in young calves takes place then In the British surveys and in that carried out by Mr Murphy, M R C V S of the Department of Agriculture it was observed that 90 per cent of the mortality was under two months old From long experience we know that mortality in calves born from June onwards is negligible Hence by taking the number of calves born in the preceding twelve months and taking from it the number recorded in June we get a figure which represents eventually the mortality in calves under six months It is essentially a feature of the Spring and early Summer, mainly occurring in the southern counties especially where the concentration of cows is highest White scour is by far the greatest single cause of death, it is an infectious disease The Tables show the evidence collected for these deaths In the surveys in Ireland the worst district—Limerick/North

Cork—was chosen Outside Munster where there is a preponderance of herds with a few cows it has not been a problem except in occasional herds

Mortality in older calves

This is the loss in calves recorded as under one year until they are recorded in the next year in the group 1–2 years when they would be yearlings mainly, (about 80 per cent) would be under 1½ years We are satisfied that in the past, before 1949, the vast majority of those casualties died from internal parasites In 1954 1,037,000 calves were in the under 1 year old group—in 1955 when calves were enumerated again in the 1–2 years group they numbered 1,024,000 a difference of 13,000 allowing 3,000 for calves slaughtered, the loss from mortality is 10,000 or 1 per cent See paragraph on internal parasites and Table 18

TABLE 18

June	Calves under 1 year	June	Yearlings 1 2 years	Calves slaughtered	Calves died June to June	Percentage calves died
1939/47	963,000	1940/48	891,000	6,000	66,000	6 8
1948	853,000	1949	804,000	4,000	45,000	5 3
1949	951,000	1950	912,000	4,000	35,000	3 6
1950	983,000	1951	974,000	3,000	6,600	0 6
1951	977,000	1952	950,000	3,000	24,000	2 4
1952	957 000	1953	938,000	3,000	6,000	0 6
1953	998,000	1954	989,000	3,000	6,000	0 7
1954	1,037,000	1955	1,024,000	3,000	10,000	1 0

Total Calf losses

The total calf losses are set out in Table 19 and come to 198,000 being 16 per cent of the calves which could have been born if all the cows were fertile, of these 123,000 were lost because of some form of pre-natal defects, and 75,000 are put down for actual mortality

TABLE 19

Total Calves Lost

		Causes of calf losses		
			No of Calves	
(1) Cows, 1954	1,204,000			
(2) Possible calves born 53/54	1,228,000	Barren cows	61,000	Not born alive
(3) Yearlings 1 2 yrs, 1955	1,024,000	Abortions	31,000	
(4) Total calves missing	204,000	Stillbirths	31,000	
(5) Calves slaughtered	6,000	Scour, etc	65,000	Born alive
(6) Calves missing through disease (4 minus 5) or abnormalities	198,000	Parasites, etc	10,000	
		Total calves lost	198,000	
(7) Percentage missing through diseases or abnormalities	16%			

Tuberculosis in Cattle

Losses from tuberculosis have already been included in abattoir condemnations and disposals of cows They are also included in calf losses since 1–2 per cent of cows become sterile because of this disease Losses through deaths and output of meat are relatively negligible in all except cows

With an incidence of 40 per cent tuberculosis in cows it is estimated in Great Britain that 2 per cent of all cows become wasters because of this disease This wasting of course varies from the initial stages to the state of emaciation In 1936, 24,000 cattle were destroyed under the Bovine Tuberculosis Order, I have not their average value but in 1932 it was £3 12s , 1931—£4 2s , 1930—£4 From these values it can be taken that the 1936 cattle were at an advanced stage of wasting—they were with few exceptions cows, and represent about 0 7 per cent of all cows Under the Bovine Tuberculosis Order here an average of about 0 2 per cent of the cows were destroyed but we are quite certain that this is far from what should have been destroyed.

On the basis of the Bovine Tuberculosis Order the British figure of 2 per cent is not far out With around 30 per cent of our cows affected with tuberculosis we would expect to have 1 5 per cent of tuberculosis wasters

TABLE 20

Milk losses

Losses in milk from Tuberculosis		Other losses from Tuberculosis	
			£
Total cows, 1954	1,200,000	Abattoir loss equal to 5,000 cows	150,000
0 5% of cows	6,000	Death of 3,000 cows	90,000
Milk loss 200 galls per cow	1,200,000 galls	Sterility 1% equals 12,000 calves loss	600,000
1 0% of cows	12,000		
Milk loss 100 galls per cow	1,200,000 galls		
Total milk loss at 2/– per gallon	£240,000	TOTAL	£840,000

Let us take the figure of 1 5 per cent for wasting at some stage, 0 5 per cent of cows at an advanced stage have a loss of 50 per cent of milk and the other 1 0 per cent have a loss of 25 per cent milk, we thus get a loss of £240,000 as shown in Table 20, which figure is not exaggerated to say the least of it Abattoir losses for 152,000 cows slaughtered were equivalent to about 5,000 cows at £30 each amounting to £150,000 I put mortality at say, 3,000 cows worth £90,000 About 1 per cent of cows are infertile with a loss of 12,000 calves worth, as adults, £600,000, bringing the total to £1,080,000

Tuberculosis Eradication Scheme

The most important thing about tuberculosis now and for many a year to come is this Scheme

The step has been taken and a scheme is in operation which can lead to the eventual eradication of the disease in a reasonable time The scheme is based on the elimination of tuberculous cows They are the main spreaders of the disease—about 30 per cent of them have it Over 99 per cent of calves are born free from tuberculosis and in well over 90 per cent cases when they do pick it up, it is from the cows Under the scheme the cows are tested by Veterinary Surgeons paid by the Department of Agriculture Cows which have the disease react to the test hence they are called the "reactors" The first step is to separate non-reactors from reactors, providing for the reactors a shed which has been cleaned out and disinfected, and if at all possible separate pastures As replacements are not available to dispose of all reactors, cows which are in the early stages of the disease, and show no signs of passing out the tubercle bacilli, may be retained separate from the healthy ones and be replaced later by heifers which have passed the tests All store and fat cattle are remarkably free from progressive tuberculosis, actually in less than 0 5 per cent of them is the disease advanced

Fundamentally this is the method of eradication being applied I have not time for details, and it is the stockowners who have to apply it and, if they do not, then the Scheme or any scheme must fail

The veterinary surgeon, who is the farmer's immediate contact, can only advise If the farmer does not take the trouble and spend the money to work the Scheme it is certain that in the not too distant future he will have more trouble and lose more money—this is due to the fact that rapid progress is being made towards the eradication of the disease in Great Britain, on which our cattle trade depends

In October, 1955—60 per cent , 5,860,000 of the 9,766,000 cattle in Britain were in 146,000 herds, which according to the tests were free from tuberculosis, leaving about 4,000,000 more cattle to be cleared In the 12 months prior to October, 1955, about 25,000 herds with about 1,000,000 cattle were cleared of the disease No cattle can enter these herds except they have passed the tests within 14 days or except they come out of another officially recognised herd free from tuberculosis At the present moment limited numbers of our cattle are being tested here and those which pass the test go into those "attested herds" in Britain, as they are called The rest of our cattle, the bulk of them, go into unattested herds, which are still to a great extent the traditional recipients of our cattle There is no doubt that the British Authorities intend to eradicate the disease, and it is equally certain that the market for untested cattle will continue to decrease till eventually we will have a surplus for that market and sale only for those cattle allowed to enter the attested herds leaving the reactors on our hands to dispose of in some other way, if we can

We cannot possibly hope to continue as we are Exporting cattle tested to satisfy the British Authorities and keeping at home those which do not, will make the job of eradication more and more difficult and there is only one way open to us which is now fairly broad but as we delay it will narrow, and that is to apply wholeheartedly the Scheme now in operation It means making an effort and a strenuous one The reacting cows must be disposed of but that is no good if we do not

breed and keep non-reacting heifers to replace them I'm afraid at the present moment that a good many farmers who are cashing in on the trade for beef cattle are crossing their dairy cows with beef bulls to an excessive extent and hoping that the other fellow will breed the dairy heifers for them The average herd is replaced in 6 years, the average cow will be gone in 6 years, she could be replaced by a tubercle-free heifer, by every farmer if he breeds her himself

Other Diseases of Cattle

Horns —Under modern conditions horns in cattle are as bad as a disease It is well established, in the abattoirs where substantial amounts of meat are condemned for bruising, that horning is the chief cause Until such time as we are stocked with the hornless or polled varieties of our present breeds, we must use the well-known simple method now available for calves under a week but which unfortunately is largely neglected—that is the caustic

Warbles —The Warble-Fly lays its eggs in the hairs of the legs of cattle The eggs hatch out a little maggot which penetrates the skin, after some months the maggot is found in the vicinity of the gullet, later it makes its way to the back under the skin, it bores a hole in the skin and eventually squeezes itself out through the hole, falls to the ground and another warble fly is liberated to continue the cycle All cattle have an instinct for this fly which does not like water or shade hence it is that when the fly is about cattle run madly for the water or the shade and spend a lot of the time there in warm weather instead of grazing, slowing up and reducing milk and meat production Many get injured in trying to find the water or shade The hole in the hide remains when it is tanned and on average there is a loss of 15/- per warbled hide In Belgium with two million cattle they estimate a loss of £805,000 per annum in milk, meat and hides In France with 16,000,000 cattle the estimate is £11,000,000 In 1952 the British Ministry of Food, being the purchaser of Britain's beef, lost £414,000 in warble hides The overall British loss for hides, meat and milk is £3,000,000 It is estimated that 70 per cent of hides from cattle slaughtered here are warbled, with a loss of 15/- each which works out for 430,000 cattle slaughtered in 1954 at £225,000 Based on the British, Belgian and French figures our overall loss is about £1½ million

Aphosphorosis

From surveys carried out by the Department of Agriculture it is estimated that only 10 per cent of the land has sufficient phosphorus —50 per cent is moderately sufficient, 40 per cent is deficient

Phosphorus is an essential element in the animal metabolism, for shortage of it in food impairs the animal's functions, with a serious shortage, the animal dies The disease set up is called aphosphorosis, and is known to some extent all over the country Surveys have been made by the Albert College and the Department of Agriculture and in several counties serious losses have been observed It is probably a major cause of infertility in cows and loss of milk Some loss is covered under other headings—an estimate is impossible at present

Summary of losses in Cattle

Table 21 Summarises the Losses

TABLE 21

Losses in Cattle.

Category	Number	Value
Barren cows	61,000	
Abortion	31,000	
Stillbirths	31,000	
Scours, etc	65,000	
Parasites, etc	10,000	
Total losses in calves	198,000	8,000 000
General diseases of cattle		2,000,000
Loss in replacement of cows		1,518,000
Loss in other cattle		566,000
Loss in cattle livers through fluke		200,000
Loss in milk through internal parasites		750 000
Loss in beef through internal parasites		1,000,000
Loss in milk through mastitis		1,500 000
Loss in milk through infertility		540,000
Loss in milk through tuberculosis		240 000
Loss through warbles		1,500 000
		17,814,000

Losses in Sheep

TABLE 22

Sheep—British Veterinary Association Survey

Hill Farms	Lowland Farms
100 ewes	100 ewes
5 barren	125 lambs
5 die	Border Leicester X Cheviot 150% lambs
5 lambs die	
85 lambs survive	

TABLE 23

Ireland (26 *Counties*)— *Average for Years* 1951 *to* 1954

A —Lambs lost		B —Possible Lambs lost	
Ewes, January	1,234,000	Ewes, January	1 234,000
Lambs born	1,357,000	Possible lambs born	1,542,000
Lambs, June	1 214 000	Lambs June	1,214,000
Spring lambs slaughtered	5,000	Spring lambs slaughtered	5,000
Actual lambs died, etc	138,000	Possible lambs died, etc	323,000
Percentage lambs dead, etc	10%	Percentage lambs dead, etc	26%
110% lambs born to ewes		125% lambs born to ewes	

C —Deaths in adult sheep

Ewes at 2½%	31,000	
Other Sheep at 2½%	11,000	
Total	42,000 at £7 each,	£294,000

TABLE 24

Total estimated actual deaths (A) and (C)	180,000 at £7 each, £1,260,000
Total losses related to possible lambs (B) and (C)	365,000 at £7 each, £2,555,000

TABLE 25

Loss in Output of Mutton, 1954

Number of sheep in output	976,000
Loss in output at 1 stone liveweight per sheep	122,000 cwt
say 100,000 sheep at £7 each	£700,000

On examining the flocks county by county it is estimated that one half are on the mountains and poor pasture, and the others on the average lowland pastures In a survey by the British Veterinary Association, a crop of 85 lambs per 100 ewes in hill flocks and of 125 in lowland sheep was determined. Applying these figures in our case gives an average crop of 110 lambs on which figure births of lambs are estimated (Table 23A) It is estimated that the average loss for 1951 to 1954 was 138,000 or 10 per cent of lambs dead from disease, accident, etc This table takes no account of infertile ewes, lambs born dead or aborted In Table 23B, it is estimated that hill sheep with care and free from disease should produce 110 lambs per 100 ewes and lowland 140, making an average of 125, which is not an unreasonable figure The loss here amounts to 323,000 lambs, or 26 per cent It is on this basis that calf losses were estimated on which basis a loss of £2,550,000 plus £700,000 for loss in mutton, is estimated, making a total of £3,250,000 There are of course losses for many other diseases The output for sheep and wool in 1954 was £9,500,000

Losses in Pigs

TABLE 26

Mortality in Pigs

Area	Litters No	Pigs per litter born	Pigs per litter weaned	Pigs lost to weaning	Percentage lost after weaning	Pigs born per sow per annum
N Ireland	1,261	11 0	9 0	18 2	1 3	17 8
Ireland (26 counties)	1,621	11 0	9 0	18 2	—	—

TABLE 27

Pig Losses in Ireland (26 *Counties*)

Sows contributing to litters, 1954		100,000
Pigs born to sows		1,780,000
Pigs lost before weaning		324,000
,, ,, after ,,		23,000
Total pigs lost		347,000
Value at 1½ cwt dead weight—£12, per cwt , £18 per pig		£6,246,000
Imported maize at 3 cwt per pig at £30 per ton } Maize—48,600 tons }	Less	£1,458,000
	Nett Loss	£4,788,000

These losses as set out in Tables 26 and 27 are from surveys made here and in Northern Ireland They show that mortality from birth to final fattening came to 347,000 pigs or 19 5 per cent If all the food were produced at home to feed these pigs, the loss would be £6,246,000 less say £500,000 for fertilisers, i e £5,746,000 , or if half the food for fattening were imported as maize the loss would be £4,788,000 No account is taken for losses through sickness, bad husbandry, etc which must come to a significant figure because of the prevalence of round worms, oedema disease, virus pneumonia and many other conditions which quite easily increase the consumption of food necessary to produce a given weight of pig These losses would easily add to the cost of imported food to make the loss on this basis €5,000,000

Losses in Poultry

TABLE 28

Mortality in Poultry, 1954

Category	Adults	Deaths	Value	Young Hens	Deaths	Value	Total Loss
A *Poultry (thousands)*							
Fowls	7,937	800	£400	5 524	250	£30	
Turkeys	127	—	£15	1 093	100	£75	£520,000
B *Egg Losses*	800,000 hens dead—say 60 eggs per hen lost Value of eggs—17s 6d *Total Loss in Eggs*—£700,000						

In egg laying trials here about 10 per cent of the birds died In Britain, R F Gordon based on the egg laying trials there estimates that 20 per cent of birds die between the point of production and the end of their first laying years Taking the 10 per cent for laying fowls (Table 28) the losses for these work out at £1,100,000 for carcases and eggs lost Losses for mortality in fowls and turkeys are worked out at £1,220,000 As poultry suffer from a lot of complaints, parasites, nutritional diseases, etc , production of eggs and meat suffer considerably This added to the mortality would make a loss of say £1,750,000 British losses are worked out at 15 per cent of total production The figure given works out at under 10 per cent for here

Losses in Horses, 1954

The most significant loss we have is that associated with infertility in thoroughbred brood mares This is the only one analysed The importance of Ireland (practically speaking, the 26 counties) in the industry will be seen from Table 29

TABLE 29

Losses in Horses, 1953/54

A	General Stud Book	650 stallions	9,000 brood mares	(approx)
	Do —Ireland	209 ,,	3,300 ,, ,,	,,
	Reported covered—Ireland		2,750 ,, ,,	,,

B IRELAND—ANALYSIS OF STUD BOOK FIGURES FOR 55 STALLIONS AND 1,608 MARES

	No	%
Stallions	55	
Mares covered	1,608	
Living foals	920	57 5
Dead and slipped foals	100	6 3
Mares barren	430	26 7
Mares died	45	2 7
No returns	113	6 8
	1,608	100

C 55 STALLIONS—FEES (ROUND FIGURES)—MARES COVERED

Fees £	50	10	150	200	250	300	400	500	
Mares covered	570	290	71	261	170	69	136	41	Total 1,608
Fees payable—1,608 mares									£260,000
Average per mare									£160
Average per living foal									£290
Average per stallion									£4,700

The analysis of the figures relating to 55 stallions about which information was obtained shows that only 920 live foals (57 5 per cent) were produced by 1,608 mares leaving 688 (42 7 per cent) which did not produce a live foal in 1954 This means that 7 mares were kept to produce 4 live foals and that four foals had to bear the costs of three mares (capital, stallion fees, keep, etc) as well as those of their dams

On these figures one year with another we carry 1,400 mares which do not produce a living foal, stallion fees must be paid for several hundred of them In Table 29B, 1,038 mares went to stallions whose fees were around £100 and upwards Many of our best mares were in that 1,038, yearlings for a great many of them have fetched several thousand pounds One would say that their owners expected to have bred foals worth at least an average of £500 each On average 440 failed to produce a live foal, which represents a loss of at least £220,000 From the cheaper stallions 240 mares did not produce live foals worth at least £50,000 From these figures, taking the high capital value of the mares spread over their foals, and all the high costs which go with bloodstock breeding, and on top of that the loss of the foal, I do not think that £500,000 is an exaggerated figure for this one aspect of bloodstock breeding Perhaps the extra foals would depress values but I do not think there would be much fear of that, in the case of the mares really worth keeping and breeding with similar stallions We have not yet all the solutions to this problem, hence the need for investigation and research

Veterinary Practice.

In veterinary practice are covered all or most of the diseases and defects (at least in the four-footed animals) which I have not mentioned There are up to 450 general practitioners, nearly all of them are busy nowadays—they surely work 150,000 vet/days yearly They average say, 1,000 first visits to farms, in all 450,000 visits By far the greatest part of their work is treating animals already sick and

mainly for diseases I have not accounted for Well over a million animals were treated by Veterinary Surgeons, and many more animals sick from these diseases were not seen by Veterinary Surgeons All this sickness means loss of meat and milk, eggs, etc

I have no valid yardstick to make an estimate of the cost, but in order to put down a figure I would say £2,000,000 as a minimum

Artificial Insemination

TABLE 30

A —Bulls on Farms

Returned as farmers at census (1946)	250,000
Number of farm units with cows, say	300,000
Number ,, ,, ,, ,, bull	20 000
Number ,, ,, ,, ,, without bull	280,000
Cows on farms with bull, 20 cows per farm	400,000
,, ,, ,, without ,,	800,000

B —Artificial Insemination

	Number of bulls	Number of cows inseminated	Percentage of cow population
1950	16	11,300	0 9
1951	38	32,600	2 7
1952	65	76,000	6 5
1953	106	115,000	10 0
1954	145	175,000	14 5
1955	176	232,000	20 0

From the figures in Table 30 it is clear that this sytem of breeding has established itself here The country lends itself to it in view of the small holdings and the very few where a bull is kept Its value is obvious when one considers how economic it is to pay high prices for the best of bulls seeing that at least 1,500 cows can be inseminated from one bull

It is the ideal method of preventing the spread of venereal diseases

Discussion

In the main I have regarded the fertility of the female animal as the basis on which to estimate the losses The females are the capital in the industry, they correspond to the buildings and machinery in a factory, it is their productivity which counts most and we keep them to turn out finished products Therefore I consider the real loss is the value of the finished product rather than the value of the unfinished articles lost The result of this has been that my losses have exceeded the 15 per cent of output which is the British estimate If I had valued calves, bonhams and lambs at their actual value my figures would be well below 15 per cent , in fact I have put down the lower figures rather than the higher

What I have set out in losses may be regarded as a goal I have tried to break them down to show the loss from particular diseases principally as a guide to indicate which of them deserves special attention

Let us take the losses in cattle First of all cows which fail to produce a live calf There are, to our knowledge, thousands of herds each year with 100 per cent fertility We believe that the main causes of infertility are aphosphorosis, contagious abortion, venereal disease in certain areas, shortage of bulls, bad husbandry, impotence in bulls

Aphosphorosis can be overcome by manuring the land or feeding phosphate to cows, contagious abortion by vaccination, venereal disease, shortage of and impotence in bulls by artificial insemination, bad husbandry by education I believe this would account for 90 per cent of infertility We are satisfied that 80 per cent –90 per cent of mortality in young calves is due to white scour which can be prevented or cured by antibiotics We have already gone 80 per cent –90 per cent of the way towards conquering losses from internal parasites, all the farmers know and use the drugs, it is a matter of using more of them to further cut the present limited losses

An outstanding feature of disease prevention is the part which the farmers must play and without which little progress can be made towards the goal set out It is amazing how much the farmer has learned and how much more he wants to learn since animals became so valuable as they are to-day Therefore, it is essential that all farmers should receive the instructions they require and apply the knowledge acquired

I can say with certainty that veterinary science in the quality of the work turned out is level with the other branches In quantity it is well up with the best of the biological sciences It would amaze those unacquainted to see the thousands engaged in research and education, the millions being spent on it, and the vast literature there is all over the world I expect the estimates here for 1956–57 will show that we are contributing no mean sum

I appreciate that there will always be a struggle against disease, veterinary science is on its feet I am satisfied that the goal I have set out is no mere mirage or rainbow, that we can and will get closer and closer to it and that the most essential proviso is the close co-operation between the farming community and the veterinary profession

TABLE 31

Summary of losses computed

	£
Losses for cattle	17,800,000
Losses for sheep	3,250,000
Losses for pigs	5,000,000
Losses for poultry	1,750,000
Losses for horses	500,000
TOTAL	£28,300,000

Disease losses in the Republic estimated on British* Basis, 1954	£
Output of animals and animal products	142,500,000
15% of output=loss	21,400,000

	Estimated animals lost	Estimated actual mortality
Cattle	227,000	105,000
Sheep	365,000	180,000
Pigs	347,000	347,000
Bloodstock	1,400	300
Poultry	1,000,000	1,000,000

Estimate in the case of cattle, sheep and horses is based on 100% fertility of the females

* In British estimate, young animals which die are estimated at their actual value before death In Britain it is estimated that 15 per cent of the output of animals is lost through disease

In conclusion, we might put it this way There is a gap of say £30,000,000 between what we made in 1954 out of our livestock and what could have been made in the absence of disease We are confident that with the full application of veterinary science and the extension of research we can go a long way towards bridging that gap I would like to pay tribute to all who have contributed to our knowledge, not only to veterinary surgeons, but to medical scientists, agricultural scientists, biologists, chemists and last but not least the observant farmer Finally I thank this Society for having invited me to read this paper which in spite of its defects, will, I hope, throw some light on the subject and provide food for thought

DISCUSSION

Professor J A Nicholson Mr Harnett has covered such a wide field that there is very little which I can add to his very comprehensive discourse Perhaps, however, I might amplify one or two of the points raised in Mr Harnett's paper When an animal dies or there is an epidemic of some disease, such as Foot and Mouth Disease, the loss is readily apparent and can be easily calculated, but as Mr Harnett has pointed out, it is hidden losses from chronic diseases and animals not thriving because of conditions, such as parasitism, etc , which form a continual drain on the farming community Such losses are hardly apparent to the owner of a small number of animals, who, in any case, probably regards them as part of the natural state of things, just that one animal is thriving better than another or that, for example, the trouble and cost of treating his animals for warble fly infestation is not worth while, since anyway he gets as much for a beast with warbles as without them Without reliable information, the owners of livestock cannot be expected to see such problems as a whole and I would suggest that proper information cannot be given without, at least, two fundamental requirements being fulfilled First, an accurate diagnosis of the trouble, and secondly, an efficient information service

With regard to diagnosis, this must primarily rest upon the practitioner in the field and in this connection it must be emphasised that the correct diagnosis and treatment of disease can only be accomplished after a long and specialised course of training In the modern development of veterinary work, the veterinary practitioner not only treats disease when it arises, but devotes an ever-increasing amount of his time and energy to the prevention of disease and giving advice to his clients as to how this may best be accomplished Like other sciences, veterinary science is continually advancing and methods of treatment, etc , become more and more specific This, in turn, requires more accurate diagnosis of the casual agent and more complicated and exact tests must be made so as to ensure that the new agents, such as the antibiotics, which are now available are used to the best advantage The practitioner in the field, whilst he may be in a position to carry out simple tests and other diagnostic proceedings, cannot be expected to have the time nor the necessary facilities for carrying out the more complex procedures demanded by modern veterinary science There should, therefore, be behind the practitioner an efficient and readily available laboratory service In this respect, we are far behind other countries and it is a matter which requires very careful thought

by all who wish to see a competitive livestock industry existing in this country The need for improved laboratory services can be seen from the fact that there are only two institutions carrying out such work in the Republic, both of them situated in Dublin, one being the Department of Agriculture's Research Laboratory at Thorndale, Drumcondra, and the other—the Veterinary College, Ballsbridge Not being a statistician, I would hesitate to base my plea on figures, but speaking as a biologist I have no hesitation in assuming that the cost of establishing regional veterinary laboratories would be amply justified, not alone for the valuable diagnostic services which they could provide, but also because they could serve as centres for the collection of vital animal statistics

At present there is almost a complete lack of information on the incidence of animal disease, apart from the returns issued by the Department of Agriculture relating to the scheduled diseases, figures given in the Annual Reports of Municipal and County Veterinary Officers and deductions such as Mr Harnett has made from the animal census of livestock It is true to say, however, that vital statistics relating to animal diseases are not available, estimates only being relied upon It has been said that estimates of disease losses have been and can be nothing more than informed guesses It follows, therefore, that information concerning the incidence, economic importance, etc, of any particular disease, particularly if it happens to be of an insidious nature, is practically impossible to obtain so that it is extremely difficult for research programmes to be worked out with the certain knowledge that the most important problem is receiving as much attention as it should This lack of vital animal statistics has been noted in all countries of the world and in this connection it is interesting to note that the U S Livestock Sanitary Association has decided to collect such information, which is to be published regularly under the title of "Animal Disease Trends" The development of a similar reporting system may be recommended in this country also The collection of the required information could be easily carried out from regional laboratories, which would be in direct touch with local veterinary practitioners

In conclusion, I should again like to congratulate Mr Harnett on his valuable contribution to the subject under discussion

Dr Geary It is incumbent on a statistician to intervene in the discussion on this essentially statistical paper Only a fellow practitioner can realise how much work went into the paper With other speakers I congratulate the lecturer on the outcome of his efforts I would like also to thank Mr Harnett for his flattering references to the agricultural statistics produced by the Central Statistics Office

His appreciation of the official statistics is evidently not shared by Mr Lytton whose complaint is not, you will have noted, the usual one of the Garda filling up the figures out of his head or being led up the garden by the farmer Mr Lytton, who is an eminent farmer, was unable to state the exact numbers of cattle in the different ages of cattle Understandably, his difficulty was the large number of cattle on his farm, a difficulty not shared, unfortunately, by many farmers Mr Harnett has worked on these figures, so have I, using in some cases advanced mathematical methods We have found that the figures contained so many inner checks and concordances—if

I had them I would cite some of them—that it is beyond question that the figures are unbiased and therefore that the aggregates have very small errors Of course, there are errors in individual returns but these largely cancel out on aggregate even at the Rural District level My advice to actual and potential users of Irish agricultural statistics is to treat them as if they were absolutely correct It is the job of the Central Statistics Office, which has access to all the material required for checking purposes, to worry about accuracy and reliability

The lecturer makes much use of the number of calves born We in the Central Statistics Office have always been somewhat sceptical about these figures, believing that the farmers have a propensity to ignore animals which died soon after birth The principal use we have made of them in the past is to establish the proportions born in each month Mr Harnett has gone a good distance towards establishing our faith in these figures Still, I cannot help still thinking that they are a little understated In his Tables 16 and 17 I have no difficulty about accepting the aggregate loss of 16 per cent as the difference between the "calf potential" and the actual numbers recorded as under 1 year of age The 10 per cent in Table 16, however, is probably too high and the 6 per cent in Table 17, in consequence, too low

Mr Harnett's estimates of annual losses are formidable indeed Viewed as losses in farmers' profits, I think that they are on the high side For example, he should probably take into account increased labour and other costs in respect of carrying larger numbers of livestock Regarded as the national loss, his estimates, if hypothetical, are probably near enough to the truth Farmers, however, will be influenced more by the profit motive, and increased profits will be substantially less than Mr Harnett's estimates May I ask Mr Harnett a question having regard to the present stage of development of veterinary science, what is the estimated gross annual avoidable loss on the basis of breeding stock remaining at present levels ? Might I also suggest that in the definitive version of the paper, Mr Harnett would be good enough to give more extended notes on his methods of estimation and sources

With regard to Dr Kennedy's point about underfeeding of cattle, might I suggest that there is an analogy here with the human population amongst whom the incidence of many diseases varies inversely with social status which is closely related to nutritional status Might I also suggest that if cattle were better fed they would probably be less prone to disease

The paper is most heartening Mr Harnett is the most practicable counsellor of perfection whom we have heard His attitude is realistic in that he does not suggest any drastic change in the pattern of agriculture Whatever view we take about the actual level of losses, it is certain that each £ of investment in veterinary treatment will yield fantastically larger returns than will any other form of investment in agriculture