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NOTES ON THE HISTORY OF THE RABBIT

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The Phoenecian and Roman Era.

The first records in the history of man's relationship with the rabbit start with the Phoenecians at the end of the second millenium B.C. Their naming of Spain, where they found rabbits very widespread, is well known. Eight hundred years later, none of the Greek writers [for example Aristotle 384-322 B.C.] mention the rabbit which indicates that it had not reached the eastern mediterranean by then. No further records occur until the second century B.C. when Polybius [ca 204 - 122 BC] comments on the presence of the rabbit in Corsica but the absence of hares. "The rabbit indeed at a distance looks like a small hare; but when taken in the hand, it is found to be widely different both in appearance and in the taste of its flesh; and it also lives generally underground." Writing in Greek, he calls the rabbit "kunikloi".

The next, and certainly the most important, text is that of Varro [116 - 27 BC] who in his eightieth year wrote his treatise on farming, De Re Rustica. In the 12th chapter of the 3rd book, he speaks of what "is still called by its ancient name of hare-warren." [leporarium]. He says "Everyone knows, too, that if you put in but a few hares of both sexes, the warren will swarm with them in a short time, so prolific is this quadruped... often when a litter has not long been born, they are found to have others inside them." And again " There is also the recent fashion, now general, of fattening them - by taking them from the warren, shutting them up in cages, and fattening them in confinement.". He describes three varieties of what he calls hare, "A third variety is found in Spain, which resembles in some measure our Italian hare, but it stands low. This is called cuniculus." Finally his companion replies "One should have...all these kinds in a warren. You, at any rate Varro, have I think too, for you were so many years in Spain that I believe the rabbits followed you here."

There can be no doubt from this description that the Romans kept rabbits in warrens and also in cages, and it seems probable that some of the details given of hares in those times, really applied to the rabbit and not the hare. What is rather surprising is that no comment was made of the antagonism that exists between the hare and the rabbit.

Strabo, [63 BC - ca 29 AD], informs us that on one of the Balearic Islands [almost certainly Majorca] rabbits were not indigenous, but from a pair introduced from the "opposite continent...thence the whole stock sprang, which formerly was so great a nuisance that even houses and trees were overturned, [being undermined] by their warrens, and the inhabitants were compelled...to resort for refuge to the Romans. However, at the present day the facility with which these animals are taken, prevent them from doing injury, consequently those who posses land cultivate it with advantage."

Pliny the Elder [ca. 23-79 AD], has written "There is also a species of hare, in Spain, which is called cuniculus; it is extremely prolific, and produces famine in the Balearic islands, by destroying the harvests. The young ones, either when cut from out of the body of the mother, or taken from the breast, without having the entrails removed, are considered a most delicate food; they are then called laurices. It is a well known fact that the inhabitants of the Balearic islands begged of the late Emperor Augustus the aid of a number of soldiers, to prevent the too rapid increase of these animals." In his next chapter [82] he writes " Hares are seldom tamed, and yet they cannot properly be called wild animals; indeed, there are many species of them which are neither tame nor wild, but of a sort of intermediate nature."Aelian [AD 170-235], Herodotus, and others of this period also write of the rabbit, whether as "hare" or "rabbit" matters not.

Darwin [1888 p. 109] believed the writings of Confucius [551-479 BC] indicate that they were probably domesticated in China at this time. Most authorities have considered this to be incorrect, the words used being considered to refer to hares and not rabbits, and the sense of the words used by Confucius are considered not indicative of domestication. However, Chen Yaowang [1984] takes the view that the present domestic rabbit originated from the native wild white rabbit of China, also Oryctolagus, and that the domestication of the rabbit began in the Han dynasty [202-220 B.C].This is opposed to the views of other Chinese scientists who consider the domestic rabbit in China was introduced as the wild [domestic ?]rabbit from Europe, via the Silk Road during relatively modern times.

Nachtsheim [1949] considered that the first true domestication of the rabbit took place in medieval France and that it was not the Romans who first domesticated the rabbit. His grounds for this belief are that selection for killing would work in favour of the perpetuation of wild characteristics, that is, when the animals were caught up for fattening, the wildest would remain and the most likely to be tamed would be caught and eaten. There is, however, another hypothesis. The Romans were aware that the rabbits bred in relative captivity and if they put them, as Varro says, in cages, and young were born therein as must surely have happened, after a period the Romans might very easily have continued to keep them in cages for breeding, thus reaching Nachtsheims' definition of the next stage of domestication.

Certainly the start of the domestication of the rabbit, then, began some 2000 years ago; it is, thus, one of the last species of common animals to be domesticated. Others have been domesticated at least five times longer Even before domestication began, man started to move rabbits from one place to another where they became established. He has continued as the great distributor of the rabbit to the present time.

The Post Roman Era to the Fifteenth century

Whether the Romans brought the rabbit to Britain 2000 years ago has always been the subject of debate. There is no question that they brought many of the foods which they greatly appreciated, alive; that is, the pheasant, the quail, the dormouse and others. It is probable that they brought the first rabbits to England. If they did the rabbits did not survive, which is not surprising with the range of carnivorous animals then in Britain. It was not until the Norman conquest that the animals became established in England, after a long presence in warrens [or preserves] in France.

There was very probably some natural spread of the Spanish rabbits into Southern France, but almost certainly man also brought rabbits into France. Since Roman times, the pleasures of hunting have driven men to release rabbits on their estates, often in enclosed warrens, and this has accounted for much of its spread. The same process still occurs today. For this purpose it is highly probable that the original wild stock was procured. Domesticated animals would have been too valuable to use in this way. Rabbit reserves for hunting and rabbit parks and islands were established at a very early stage and long before the end of the middle ages were widespread. Undoubtedly some animals escaped and formed feral populations.

The damage they did to agriculture, and particularly that of the peasants at that time, did not matter to most of the park owners, although some French kings in the fourteenth century [Philip 4th and Charles 4th] bequeathed money to those peasants bordering upon their forests "in compensation for the losses caused by the rabbits". Others, [Philip 5th, John 3rd and Charles 5th] made laws, without success, that warrens over 40 years old should be abolished.

Importations were made to the Island of Porto Santo, some 25 miles north east of Madeira. in 1420, and became a plague. The case of the Porto Santo rabbit is interesting for other reasons. Whilst it appears to be of the original stock from Spain, it had, according to Darwin [1888] evolved in such a way that it had become a separate species, it being less than half the weight of, and not breeding with, the original O. cuniculus. Ernest Haeckel [1874] was

also convinced and named it a new species, Lepus huxleyi. Nachtsheim [1941] showed that this was incorrect when he obtained successful matings between a Porto Santo doe and a buck from a Greek wild rabbit doe and a domestic rabbit buck.

The completion of the domestication process occurred certainly in the 5th or 6th century and very probably it was the French medieval monastic establishments that were responsible. They were also responsible for the early spread of the domesticated animal. The domestication stage spread over a number of centuries. There is a belief that it was only the wild rabbits that escaped from warrens, but it is highly probable that at a quite early date there was also the introduction into the warrens of the domesticated types. There are records of movements of domestic rabbits as early as the 6th century.

From at least the 12th century, domestic rabbits were being transported from country to country. In the 12th century records show animals being sent from France to Germany and almost certainly other countries. Whatever the source, by the sixteenth century there were domestic rabbits in England, some of which had certainly originated there.

That the wild rabbit had become fairly widespread by the 15th century in England is indicated by the fact that some 4000 "conies" were part of the feast celebrating the appointment of the Archbishop of York and Chancellor of England in 1465.

The speed with which domestication can be accomplished at the present time, may of course be that it is done with apparently wild, but really feral, stock. It is often suggested that it is extremely difficult to obtain fully 'tamed' rabbits by handling and selection from apparently wild rabbits. It has, however, relatively frequently, been done, and a year or two with several generations, usually suffices. The reverse is of course also true. If domestic rabbits are allowed total freedom [but usually protection and assistance is also necessary in the beginning], they will revert relatively quickly to the characteristics of the wild type.

Domestication has a number of effects. Whilst the animals become less shy and timid, the longer term physical effects include: usually an increase in weight up to as much as four times the weight of the wild animal, a reduction in brain weight, eye size, and proportion of dry skeleton to liveweight, of over 20% compared to the wild animal of the same weight and a considerably larger proportionate reduction in heart size. These are of course all features not essential to survival under protection. There are also increases in fecundity and in fertility over a lengthened breeding season. More apparent however are the changes which, usually, occur in ear size, in bodily conformation and of course in colours and fur textures.

The names of the rabbit.

The origins and variations of the names of the rabbit, in all languages are of great interest and are well discussed by Barrett-Hamilton [1910] and Bodson [1981]. Suffice it to say here that the earliest known use of "rabettes" in a list of foods for a feast in 1387 "viij dussen rabbettes" and "rabetts rostad". The word in any form in England is however, later than the original word coney, in its various forms. It appears first in the thirteenth century first in Norman French and later in English in 1302.

Prior to the use of the word coney, the Latin cuniculus was used, the word coney coming not from the Latin but from the old French conil, connil or counil. The Norman word for rabbits was conis, hence the English conies.

The use of the word rabbit was restricted at first to the young rabbit. In 1440 "rabet" is a "yonge conye"; in "The Boke of Saint Albans" by Dame Juliana Berners [1486], the distinction is clear between "a Bery [burrow] of conyis [adult]" and "A Nest of Rabettis [young]". By 1575 the two names were still used in Turbervile, "The Conie beareth hyr Rabettes xxx dayes, and then Kindeleth" in his Noble Arte of Venerie or Hunting.

There has been a tendency in recent years to insist that a special name should be given to young rabbits, kit and pup, bunny and kid and many others have all been used, but the

indiscriminate use of such terms has caused a good deal of confusion. The name for a young rabbit is - a young rabbit.

The Sixteenth Century and Onwards.

By the end of the middle ages domesticated rabbits were widely spread. Georgii Agricola gives details of different colours of rabbits which were being kept. Thomas Tusser, writing his "A hundreth good points of husbandrie" in 1557, says in the list of work for January, "Let Doe go to buck, with Conie good luck, Spare Labour nor monie, store borough [i.e. warren] with conie." There can be little doubt then that he is making a distinction between rabbits kept confined in cages of some sort, in addition to rabbits in the warren. By the seventeenth century some domestic rabbit keeping had become established in England and elsewhere.

In 1600 a translation of a French Book was published by Richard Surflet. This discusses rabbits in detail, but of course refers to the French situation. It becomes clear that the warren was not to be confused with rabbits running wild in a wood, and also that a 'clapper' [i.e. french clapier or rabbitry of hutches] was necessary for the proper conduct of the warren by re-stocking, and the fattening of rabbits. The clapper would consist of "certaine small lodgings paved with boords", and the book appears to be the first to recommend post-partum mating.

Gervase Markham, a most prolific writer on agricultural matters in the early part of the 17th century, has in several books much to say about rabbits, both wild and tame. In A Way to Get Wealth [1631] he writes that "The female or Doe Conies are wonderful in their increase, and bring forth young ones every month: Therefore, when you keep them tame in Boxes, you must observe them, and as soone as they have kindled, to put them to the Buck. The boxes, in which you shall keep your tame Conies, would be made of thin Wainscot-board, some two feet square, and one foot high; with a lesser room in which the Conie may lodge and kindle...and thus you may make boxe upon boxe in different stories."

His directions for the choice of bucks is explicit. "As for the choice of these tame rich Conies, you shall not, as in other Cattel, look not to their shape, but to their richnesse," Size was important but the silver colour, with fur "thicke, deepe, smooth and shining" was paramount. After the silver " a blacke coat without silver hairs, though it be not reckoned a rich coat, yet it is to be preferred before a white, a pyde, a yellow, a dun or a grey". The best rabbits were worth five times as much as others, and the best skins 8 or 10 times other skins, fetching as much as 2 shillings or more. The domestic rabbit also "increase oftener, and bring forth more Rabbets at one kindling than any wilde Conie doth,...for their skins will ever pay their Masters charge with a most large interest." For feeding he recommends "the sweetest, shortest softest, and best Hay you can get....In the troughs under their boxes, you shall put sweet Oates, and their water." His words of wisdom were to be repeated many times in the next at least 150 years, often word for word.

Mortimer [1707] remarks that "many make great Profit of them by keeping of them in Hutches near great Towns,....for the tame Rabbets must lie dry, and warm, or else they will not Breed in Winter, which is the chief time of their Profit." He also mentions most unusually "the White Shock Turky Rabbet" by which he means the Angora.

Bradley [1724] comments on an improved pit system in which fifty does were kept in a paved court with individual cells each of which had a trap door to allow them to be confined or released into the general yard. Two bucks were kept chained at one end of the court "for the service of the Does" a system which was used in some establishments into the nineteenth century.

Although the rabbit court and rabbit pit had been in existence for very many years it was beginning to be realised that "There are more profits by far in Hutches than in pits" and "when their Skins are clear without Spots [i. e. moult free,] a single one is worth 4d or 6d". [The Complete Family Piece, Anon. 1739]. This is one of the first books which recommends the

weaning of young at two months, "and at five Weeks End let her take Buck, that the former Brood may go off before the kits about a week", and adds that "A doe is reckoned to pay 10 s[hillings] a Year clear, and that her Dung will pay for Grains."

Any number of Agricultural books were written in the eighteenth century, most of which included some details of rabbits, both in warrens and in hutches. Without fail they enlarged upon the profits to be made. It must however be said that quite often they were copied one from another, indeed in some cases word for word. Thus in 1771, The Country Gentleman and Farmer's Treasury of Useful Knowledge, was written by an unknown author, to the title of which was added "To which are added a curious Treatise on the Breeding and Management of Wild and Tame Conies". This item was entirely a copy of the words of Gervase Markham on tame rabbits, written 140 years before.

It is somewhat singular that it is difficult to find at this time much mention of Angoras or their wool in England. It is peculiar because the Angora and its culture must have been known, for in 1789 there was published in Dresden a book "Instructions for the Angora or English Rabbit Breeding" by F. Ch. S. Mayer, with a second part "The Improved Rabbits by Silk Rabbit Bucks" written by Johann Riem in 1792. The entire work consists of 114 pages.

Apparently in 1777 the "English Silkhaired Rabbit" was taken from England to Germany where they were found to be very useful. Mayer in a fairly short period exported them to Vienna, Prague, Bayreuth and Holland. Reim adds that Angoras were to be found [1792] in France, Italy, Denmark and England.

The most detailed instructions are given as to the keeping of Angoras, even to the castration of bucks to prevent fighting. The biggest problem appears to have been disease. Harvesting the wool was done by combing and plucking and 350 to 480 grammes of wool per year per head was obtained.

In England warrens had been increasing in number slowly from the 14th century but the eighteenth and nineteenth centuries saw a great increase in warrening as a commercial activity. It was generally considered that poor quality land invariably paid better with rabbits than any other crop, a different story at the end of that century to poultry, which were considered highly unlikely to make a profit commercially, a situation which continued in England until the latter part of the nineteenth century, when almost the entire supply of eggs came from abroad.

Parkinson [1810] writes at length on the matter of warrens and gives accounts showing a profit of some £518 a year on a total expenditure of £332 [rent of farm, £250, full time warrener £31 [including rent and 2 cows], 3 killers for 12 weeks, including board, £20.8s.]. Whilst he was much in favour of warrens he adds that opposition to warrening occurred because of its dreary appearance, the impossibility of growing trees, the impossibility of all field sports in the area, the encouragement of poachers and, on moral grounds, that the system used less labour than other forms of farming. The larger Lincolnshire rabbit farmers sold the rabbits as carcases on the London markets at £13 per hundred, but the skins were dried in small drying rooms with a charcoal fire. Parkinson adds that "this is a profitable proceeding, as many men who have followed this rabbit-jobbing business have amassed very large fortunes."

Parkinson also deals with hutched rabbits. He recommends fostering over six young per litter, selling the rabbits at 5 weeks of age, when they fetched 14 pence each, and the use of twenty to thirty bushels of rabbit dung per acre to increase the yield of the crop by 30 percent. In the great need for fertilisers at this period rabbit dung was very highly prized. Parkinson notes that farmers in Buckinghamshire were so anxious to get it that they would transport it from London where it was "sold so cheap as about 6d a bushel." [about 1.25 cubic feet] ! This would mean that the price per ton would be at least equivalent to some four weeks wages of a labourer. The manure seems to have contributed quite a lot to the profits made from the domestic rabbit.

Dickson [1824] gives probably the most extensive details published up to this time and includes the selection of stock, the size and design of hutches, including what might be termed

the first flat deck system, a system for keeping dung pure, and the use of sawdust as litter.

During the second half of the nineteenth century what could be called a split between the warren and hutch rabbit keeping appeared. There was a definite movement to small scale rabbit keeping for meat. The cottage economy became the subject of much agricultural writing. From this time on, with increasing frequency, small handbooks were published encouraging the keeping of rabbits on a small scale. Some of them, towards the end of the period, were very good, e.g. Journal of Horticulture, [1864] and a colour plate 'Book of the Rabbit' [1881] but others were very poor indeed with advice which certainly meant that little success would attend the enterprise. In other cases the general farming books contained sections devoted to rabbit keeping [e.g. Ward & Lock's Book of Farm Management, London, 1881]. Almost without exception, however, these books had one thing in common - they all treated the subject linking together meat rabbits, childrens' pets, the simplicity of rabbit keeping and the fancy rabbit. It was solely a home or cottage economy.

In the 1880's and 1890's in England, agriculture was in a very poor state. Attempts were being made by the the Government to exterminate the wild rabbit on agricultural land and the Ground Game Act of 1880, was introduced, which gave all occupiers a right to kill rabbits on their land. One result of the legislation, however, was that fears grew that the supply of rabbit meat would greatly diminish and in just a few years the price increased by 50 %.

This gave rise to a great deal of discussion on the subject of rabbits as food and how they should be kept in the future, and three books, which had a great influence, were published. These were: Rabbits as a Food Supply, by G.F. Morant, 1883; Rabbits for Profit and Rabbits for Powder, by R.J. Lloyd-Price, 1884, and The Wild Rabbit in a New Aspect by J. Simpson, 1893.

Simpson's book dealt solely with developed forms of warrening and how this could be improved, but Morant and Lloyd-Price dealt with hutch bred rabbits, although Lloyd-Price added a section on "shooting warrens".

It was however Morant's book which led to his name being given to a particular type of rabbit keeping by the use of a movable ark with a wire meshed floor, through which the rabbits could graze, with a wooden roof and sides except for part of the front. It could be used for growing stock or, with a nest box, a breeding hutch. The Morant hutch was moved usually twice per day over grass. This system was used occasionally until the 1950's, although there were a number of modifications. It was also the system mainly used in large scale farming in Russia in the late 1920's.

Lloyd-Price firmly believed that if his hutch system of rabbit farming "had been more thoroughly explained...the notion would not have been so prevalent that rabbit farming upon a large scale was, as poultry farming is admitted to have been, bound to fail".

That the idea of large scale rabbit farming became something of a fashion is indicated by the books being reprinted several times at short intervals. Within fifteen years, however, there was very little large scale commercial rabbit farming with this or any other system. There is perhaps some link between these writers and the subsequent Belgian Hare Boom in America, for all three authors write in one way or another of Belgian Hares, and there is little doubt that this information was communicated to America.

Aspects of the different identities of the rabbit.

One cannot appreciate the full significance of some points in the history of the rabbit, particularly the history of the last 100 years, without recognising the different identities of the rabbit. These include:

1. the original rabbit the phoenecians knew, certainly different in some respects to the wild/feral rabbit in the modern world;
2. the Roman rabbit, raised in their leporaria and almost certainly partly if not substantially domesticated and in one form or another taken elsewhere;

3. the medieval rabbit, transported to France and there left to remain wild or to become feral and also fully domesticated;
4. the warren rabbit, for certainly 600 years providing some individuals with substantial profits, but the countryside in which it lived with a burden of loss;
5. the sporting rabbit being, hunted for a thousand years or more and in more recent times one of the main small game animals of the world;
6. the rabbit taken by man to so many places where it has caused plagues of quite remarkable proportions;
7. the very variable domestic rabbit, developed constantly into new varieties which themselves become changed and are sometimes lost;
8. the natural history rabbit, the subject of much study by the great naturalists and scientists of the past, and present, Leeuwenhoek, Agricola, Aldrovandi, Gesner, and thousands of others;
9. the genetics rabbit, the animal used a great deal by the early geneticists, Castle, Nachtsheim, Punnet and Crewe and so many others;
10. the modern scientific rabbit with its two fold role, its numerous uses in the study of biological phenomena and disease and its role in the preparation and testing of drugs;
11. the industrial rabbit, with a great number of different types of industry and three products, the meat, the fur, and wool;
12. the Fancy rabbit which, for the last 200 years or so, has been bred by dedicated men and women to produce more and more perfect specimens of the different varieties of rabbits with a passion that builds into intense rivalry in the exhibition world;
13. the vermin rabbit, to be destroyed in any possible way;
14. the childrens' rabbit, as a hero of innumerable childrens' books, cartoons, films and videos and a beloved pet [the third most popular in England];
15. the well known rabbit, for in both its wild and domestic form it is better known than any other animal throughout the world;
16. and finally the rabbit of the written word. An enormous amount on all aspects has been written but in many cases is so scattered that it is lost.

The Spread of The Rabbit in the last few hundreds of years

Attempts to introduce the rabbit into Australia using domestic animals, failed. The first such attempt was in 1788, with some five domestic rabbits. There followed several other importations which did not establish themselves. It was only when a consignment of 24 wild rabbits were shipped from England in 1859, to stock a farm near Geelong, Victoria for sport, that it became fully established and spread very rapidly. The speed with which it did so is astonishing. By 1880, 20 years later, the rabbits had moved a distance of some 300 miles. In the next six years they moved over 350 miles.

In New Zealand, many early introductions, the first in the very early 1800's and all probably of domestic or recently feral types, were unsuccessful. In the 1860's however, introductions of wild animals took a similar course to the explosive spread in Australia.

Introductions into Chile spread from Tierra del Fuego throughout the greater part of the coastal areas to over half the length of the country, and some spread inland also occurred.

As far north as the Swedish Island of Gotland and parts of Norway, the rabbit has successfully established itself. Feral rabbits are also found in Lower Egypt and in Uganda in Africa. In the last century or two, rabbits have been introduced into many islands where they often reached plague proportions.

Domestic rabbits were introduced on to Smith Island of the San Juan Islands group off the coast of Washington. Possibly prior to, but certainly "about the year 1900 a lighthouse keeper purchased a few so-called Belgian Hares, with the idea of supplementing his meagre income through meat sales to the Seattle markets. Subsequently, at four year intervals, Black Flemish

and New Zealand Breeds were introduced to prevent inbreeding...a later keeper, not being interested in commercial pursuits, left the rabbits to shift for themselves.... until 1924 when the Navy Department requested assistance.... [as] the rabbits were undermining the buildings." The rabbits had ruined the vegetation and were exterminated. [Couch, 1929]. A number of other islands in the same group carried stocks of feral rabbits and Couch suggests that the history of these domesticated rabbits could be traced back to the time when the Hudson Bay Company occupied the region.

Rabbits were introduced to a number of Pacific Islands. [Watson, 1961] In about 1903, the manager of the Pacific island of Laysan, introduced various breeds of domestic rabbits. By 1911 it was found that although the rabbits had killed many bushes and exterminated several plant species, the damage was less than might have been expected from their numbers. They were finally exterminated after more than 5000 rabbits were killed and the island had been reduced to a barren waste. Vegetation regeneration then occurred. On Lisianski Island, rabbits from Laysan had destroyed much vegetation by 1913. By 1923 the rabbits having stripped all the vegetation, died, apparently from starvation, and the vegetation started to regenerate.

Prior to 1915 domestic breeds were introduced to several other Hawaiian islands which have periodic droughts. The rabbit populations were subject to violent fluctuation in numbers due to food shortages in those times and Watson considers this to be the factor that allowed the vegetation to recover periodically and the rabbits to survive. Phoenix Island, almost on the Equator, provides conditions only just within the level of tolerance of rabbits. On Phillip Island the rabbits and the vegetation appeared to have reached equilibrium after some one hundred years.

Another quite different environment is that of the southern Indian Ocean Kerguelen Island, a heavily glaciated land with long dark winters and freezing temperatures. Domesticated rabbits introduced in 1874 became well established. Since their introduction they have exterminated the native cabbage, [Pringlea antiscorbutica] over very large areas in which they now have to exist largely on sea weed.

A constant fear that the importation of rabbits into South Africa might lead to the same situation as in Australia caused a ban to be imposed on the importation of any rabbits in the early 1920's, although at that time there were numbers of domesticated rabbits in the country. The ban was, however. lifted a few years later when a very small but thriving rabbit industry was established and the Government even went so far as to authorize a small amount of research on the animal at the Experiment Station Cedara in Natal. A second ban was later imposed and it was not until the end of the 1970's that this ban was lifted again.

A study of the introductions which have been made almost world wide indicates two important features. The first is the enormous adaptability of the rabbit, both wild and domestic, which can exist in conditions ranging from the tropical to the arctic on an exceptionally wide and varied diet. This adaptability has important implications for those who are interested in the use of the rabbit for the benefit of man.

The second point is something of a paradox. It is that the domesticated animals have on many occasions only managed to survive with the aid of man until they have established a firm foot hold in their new environment. In other cases domestic rabbits have been able, in apparently exceptional circumstances, to establish themselves in areas which would not at first sight seem promising.

Their early distribution throughout Europe which occurred almost invariably to warrens of various types, where man assisted in their welfare, lends some support to the idea that in fact the spread of the rabbit in Europe was most likely of domesticated, semi-domesticated, or at least feral, stock. When animals from the warrens escaped, having gone some way towards becoming feral, they relatively quickly resumed a wild state. Both Nactsheim [1949] and Fitter [1959] have considered this the correct hypothesis.

Notwithstanding the knowledge that true domestic stock usually have great difficulty in

establishing themselves in the wild, resistance to domestic rabbit farming, not only in Australia and New Zealand, but in other countries has been based on the totally mistaken belief that if some domestic rabbits were allowed to become feral they would survive happily, return to the truly wild state, and, often remaining as giant rabbits, become an even greater danger.

The Plagues of The Wild Rabbit.

The damage and loss to Agriculture and Forestry throughout the world is caused not only by the food that the rabbit consumes, by its destruction of young trees and the damage that occurs through its burrowing. The greatest cause of loss wworldwide is by the rabbits destruction of pasture and the loss of grazing for other farm stock. In Europe the greater damage, however, is by its food consumption, damage to trees and burrowing.

The first plague of course was in the Balearics, when the occupants were almost driven out of their country by rabbit damage to their harvests. Since then there have been many.

The costs of the wild rabbit in different parts of the world are incalculable but astronomical. Some examples should sufficiently describe this.

In the early 1900's in Western Australia, one fence alone was built over a distance of some 1100 miles, at enormous cost, over a period of five years. It did not however stop the spread of the rabbit. Neither did the numerous other similar fences so erected. The cost of attempts to maintain them was not inconsiderable. This was however a minor cost when compared with the many millions of pounds which have been spent in attempts to find control measures. On one occasion, in desperation, a prize of £25,000 [a very large sum at that time] was offered for a solution, and over 1400 applications were made, one of which was from Louis Pasteur with suggestions for control by disease.

The cost to the Government of New South Wales, in three years ending in 1883, for attempts to control the rabbit amounted to over £360,000.

Calculations in Australia indicate that the additional annual value in 1953 of the sheep wool and meat crop attributable solely to the reduction of the wild rabbit by myxomatosis was of the order of £35,000,000 [Reid, 1953].

When myxomatosis entered the U.K. it was welcomed with delight by the majority of the farming community. Estimate of the yearly cost to farming and forestry varied from a minimum of £50 million to over £100 million per annum.

These are only a few of hundreds of such items. There can be no other case of a cost to man by any other animal which has reached in the last 100 years even a few percent of the cost of the wild rabbit.

The Rabbit Fancier and the Rabbit Farmer.

As there has been for at least 150 years, an interacting relationship between wild, pet, exhibition and commercial rabbits, so there has also been an odd relationship between the Rabbit Farmer and the Rabbit Fancier. Some may change from one to the other and some may be both, but this is unusual in the U.K. where there has always existed a sort of hostility between them.

That the Fancier has maintained a wide gene pool cannot be doubted, and this must be of benefit to the rabbit world in general. But there are today a greater numbers of fanciers throughout the world who select breeding stock for non utilitarian characteristics than there are meat fur or wool producers, and this has unquestionably influenced the development of a purely utilitarian industry.

The philosophies and aims of the Farmer and the Fancier are completely different. The commercial producer must be concerned to produce the largest number possible of animals of a uniform good quality, for meat or wool or fur, at the lowest possible overall cost. The Rabbit

Fancier on the other hand is concerned with the production of single individuals which resemble to the highest degree possible a somewhat arbitrary exhibition standard. A number of characteristics of this standard are obtained by processes which involve but little certainty.

What has always been necessary for the establishment of the intensive [or indeed semi-intensive] commercial production of rabbit meat has been the development of pure meat type rabbits, with no concessions whatsoever being made to the exhibition requirements or mentality.

Exactly the same problem has occurred in the field of Angora Wool production. Indeed in this case it is true to say that some of the best exhibition characteristics are positively opposed to commercial requirements.

The Evolution of New Breeds.

All domestic rabbits throughout the world are the same species, Oryctolagus cuniculus, and all domestic breeds arise through either a mutation or by a combination of different inherited characteristics. Selection thereafter modifies the breed or colour variety by an increase or decrease of the modifying genes.

Breeds and varieties are not static. They evolve by selective breeding often at a remarkably rapid rate. Some breeds change over a period of say forty years, to such an extent that they might not be considered to be the same breed. Furthermore the same breed, perhaps originating separately in two different countries, or being taken from one country to another, may subsequently vary to such an extent that they become recognisably different breeds.

Different breeds are produced and evolve for purely utilitarian purposes or for exhibition and competition. In many cases in the past, those that have been produced for one purpose have changed to the other, usually from the utilitarian to the fancy.

Attempts to produce breeds, or more accurately strains or families, having the best utilitarian characteristics, in particular for the production of meat, have lagged far behind the search for new fancy rabbits. France, with certainly after the war the largest industry in the world, has been the leader in this field, followed perhaps by Italy and Spain. In many countries it has been greatly neglected. In the U.K. it has rested almost entirely with the individual farmer to attempt to improve his own stock by judicious breeding.

On the other hand the increase of fancy breeds has been great. Although the increase in fur breeds did start on the basis that they would be of utilitarian value they are now, in the U.K., almost solely confined to exhibition purposes.

Prior to 1850, apart from silvers and occasionally pure colours, the rabbits were usually more or less spotted or patterned and by 1850 the English pattern [Butterfly smut] had gained some form of formal description of excellence or standard. Colour was not however of much importance, either to the farmer [or feeders as they were then known, in order to distinguish them from warreners], or to the Fancier.

The Lop with its grossly enlarged ears was par excellence the Fancy exhibit. As Delamer, the leading Fancy writer at the time said in 1854 "Flat Lops are the most unnatural, and therefore the most perfect and valuable rabbits in a fancier's estimation." [Delamer 1854.]

The proliferation of breeds, particularly the fur breeds, in England during the 1920's occurred for several reasons. The main one was the growing interest in the establishment of a Fur Industry using rabbits. This brought about the importation of Chinchillas, from which the Sables were derived, and the Rex following their first discovery in 1919. There was also at this time the synthesis of new breeds. Experimental work at Cambridge to establish the colour of a rabbit homozygous for self, brown and dilution by H. Onslow prior to 1913 [when it was first exhibited in London] produced the Lilac known originally as the Cambridge Blue. Pickard attempting to emulate the wild Silver Fox, produced the Silver Fox Rabbit. The Sables, originally rejects produced in litters of Chinchillas, were developed in response to the Fur Trades desire for a rabbit the fur of which resembled as closely as possible the fur of the wild Sable.

The introduction of new breeds occurs in waves of fashion. Thus immediately the Rex breeds were available, considerable numbers were imported into England and most other breeds were "rexed", producing what amounted to new breeds. The novelty of a new breed has an important influence on its early spread. Of recent years there has been a marked increase in the smaller breeds, particularly those but recently imported into the U.K.

The table below shows a comparison of the numbers of breeds and varieties in England over the past 150 years.

	Fancy		Normal Fur		Rex		Total	
Year	Breeds	Varieties	Breeds	Varieties	Breeds	Varieties	Breeds	Varieties
1850	4	10 colours	-	-	-	-	4	10
1900	11	42	-	-	-	-	11	42
1950	13	71	15	43	4	42	32	156
1990	20	191	28	97	8	154	56	442

These figures show the number of separate breeds and the total of colour varieties for all the breeds that were [by 1900] recognised and standardized with a formal written description and were being bred, even if only to a very limited extent. There were some other varieties which were created and bred but not recognised by the standards authorities. At different dates there were also breeds and varieties [not included] which had previously been recognised and bred but which had become extinct.

In 1850 [and almost certainly in 1800] there was the Angora, 2 classes of Tame rabbits [Small Variety and Large Variety], and the Lop, of which there were 4 types depending on the fall of ear [Half Lop, Oar Lop, Horn Lop and Flat Lop [i.e. the present English Lop form]. In total there were 10 colours rarely pure and most often spotted or broken colours. Distinct colour varieties were only recognised in the Lop in exhibitions and these totalled nine altogether.

This, then, is a brief history of the growth of the breeds and varieties in the U.K. The same situation is paralleled in other countries. The total identifiable breeds throughout Europe approaches 200 [with innumerable colour varieties] and the number throughout the world is in excess of that.

The Rabbit in Times of Scarcity and War.

It is in times of war, protracted ones at least, or times of scarcity of food, that the rabbit is utilized most. This of course, is due to its ability to produce meat from foods that cannot be easily utilised for other animals or man, the rapidity with which that meat can be produced and the fact that people who do not normally produce food can do so with relatively little training.

The 1914-18 war produced a great increase in rabbit keeping in many countries. In the United Kingdom, great efforts were made and the number of rabbit keepers for meat for local consumption, [some of whom later became fanciers] increased by an estimated 15 times.

Rabbit keeping during the 1939-45 war has been better documented. When the possibilities of war became apparent, considerable thought was given to domestic food production. Rabbits featured quite largely in these deliberations and reports were made to the Minister of Agriculture concerning the actions which should be taken some time before war became imminent.

It was decided that Government action would have to be limited to encouraging and training and possibly a small allotment of feeding stuffs which were not entirely satisfactory for other animals. Rabbits would have to exist on green foods, waste from the home and any foods that the home producer could grow himself. Some prior organisation took place and soon after the war started officials were appointed to encourage rabbit breeding.

From August 1941 an allotment of 28lbs of bran per breeding doe was made to rabbit breeders to encourage the use of mashes from household waste, despite the advice of scientists at Cambridge that the amount was insufficient and bran the wrong foodstuff ! The allotment was at first taken up fairly well by possibly half the actual number of rabbit breeders. The numbers of rabbit breeders claiming bran increased until well over 100,000 rabbit breeders claimed their rations of bran for well over half a million breeding does, a stage reached in the early part of 1943, by which time a record number of over 3,000 rabbit clubs had been formed, in part to distribute the bran rations. The returns then started to show a steady reduction in the number of rabbit keepers, until the end of bran rationing in July 1953. Some bureaucratic circles considered this an indication of a steady decline in rabbit keeping. It was nothing of the sort. Much other evidence indicated quite the reverse. What the figures really showed was the learning curve of rabbit breeders as to the value and use of bran. Some other steps to encourage rabbit keeping were taken in the education and organising fields and there is little doubt that a considerable meat supply was produced.

The same thing has occurred in all countries subjected to war and other periods of food scarcity. The current attempts to encourage the use of the rabbit in third world countries is a classic example. It might be mentioned that some forty years ago attempts to do this were made through what were then known as Empire Livestock Officers. Some of the present domesticated stocks of rabbits are in fact a legacy of that period.

The Attempts to Start a Domestic Rabbit Industry in England.

Whilst there had been an industry based on the warren rabbit for a considerable period, a rabbit industry based on the hutched domestic rabbit can only be said to have started spasmodically in the U.K. in the early part of the nineteenth century. In France the rabbit industry started up slightly later but of course that industry continued with far fewer interruptions than the English, and has progressed infinitely further. In Italy Monzini [1874] writing at least twenty years after the start of the French industry, was pleading with his fellow countrymen to start keeping domesticated rabbits on a cottage basis at least.

The commencement of any industry is difficult to establish accurately and certainly rabbit husbandry, merging as it does over a long period with a cottage economy type of rabbit keeping, is particularly difficult. Furthermore commercial rabbit farming started at greatly different periods in different countries. The following remarks therefore relate solely to commercial rabbit keeping in England.

Lawrence [1815] mentions that he had had reports of one or two large farmers near London, with fifteen hundred to two thousand hutched does each. These had by 1815 stopped production. Most of the supplies came from the country, the animals being kept in small cages in huts. There were however a number of smaller producers in London. It was apparently the custom to feed cereals to a great extent and disease did not appear to be a problem.

From the middle of the century increasing numbers of domestic rabbits [mostly carcases came from the Continent. Estimates between 350,000 and 500,000 per week have been given, but these figures are almost certainly too high, although an average of 5 million per year of 'tames' were recorded at Leadenhall market in London in the early 1900's.

During the last quarter of the nineteenth century, the term Ostend rabbit became synonymous with the best quality of domestic rabbit ['tame' as it was always called] and a particular method of dressing the carcase for display. At the same time also increasing amounts of wild rabbit meat were being imported from Australia and New Zealand which all prevented any large scale increases in domestic rabbit farming. There was a considerable increase in domestic rabbit keeping during the 1914-18 war, but that was not an industry.

The 1920's saw attempts to start both a rabbit fur and a rabbit wool industry. By 1920 the Fur Board Ltd. had been established. It was the first true co-operative and its members sent in

their dried rabbit pelts and received a percentage of the market value and after the skins had been sold, the surplus was divided amongst the members. By 1930, the membership of the Fur Board had increased to slightly over 3,000 members. The size of the angora wool industry is difficult to estimate, but a census in 1928 established that there were a minimum of 1300 Angora breeders and a minimum of over 100,000 breeding stock.

That domestic rabbit meat, at this time, was still in demand is shown by the import figures. During the last three years of the 1930's over 2,500 tonnes per year of domestic rabbit meat was imported from Europe, the bulk of it [over 2,000 tonnes] being from Belgium. In addition an average of nearly 1,400 tonnes per year of fresh rabbit meat came from the Irish Free State, but some of this was undoubtedly wild. Wild rabbit meat imports, mostly frozen and very largely from Australia and New Zealand, averaged over 8,600 tonnes per year; imports therefore totalled 12.500 tonnes. In addition, home produced wild rabbit meat certainly exceeded the same quantity. The home production of domestic rabbit meat is extremely difficult to estimate accurately but at this time the annual production was probably between 5 and 6,000 tons, giving a total of all rabbit meat of the order of 30,000 tonnes per year.

Both the fur industry and the wool industry developed to a fair extent, and in some cases thriving enterprises were established. Prices of as much as 10 shillings each for the best skins were obtained, this being equivalent to about one quarter of a week's wage for an agricultural worker. The meat of course was sold on the meat markets.

By the end of the 1920's it seemed that at last an industry would develop. However in the early 1930's enormous numbers of Russian furs [not many rabbit] came into the country, the great depression occurred and the fur market collapsed. Angora wool producers suffered no better. This was the situation by 1939, after which there was a great increase in rabbit keeping, but again, mostly on a household basis.

The Russian Experience.

A curious and little known affair concerns the attempts, in the 1920's, to "establish immense rabbit farms designed to feed and rescue Russia's millions from enforced vegetarianism due to the depletion of ordinary flocks and herds" and to clothe them with the furs. An account of this extraordinary story is contained in a book by the Times correspondent in Russia. [Urch. 1939]. The following notes are taken partly from this book.

The man at the centre of this scheme was Grigoriy Philippoff, born in 1900, who in the 1920's in post-revolutionary Russia [a period of great privation] put forward a scheme for "the rabbitization" of Russia, which was approved by the Government. As a start, in 1927, he was granted 3 acres of land at Kraskovo, 20 miles from Moscow, to establish a rabbit farm on which he maintained the 100 rabbits he received in a morant hutch type system supplemented by greenfoods collected locally. During the same year 13,000 rabbits were imported for the new scheme from abroad. He had no prior knowledge of rabbits, not any person to turn to for advice..

It was estimated that there were only 400,000 breeding does in the whole of Russia and those of poor quality. Philippoff quoted the estimates in the Small Soviet Encyclopaedia "that a single pair of well-matched rabbits properly handled might produce more than a million descendants in the course of 4 years," and "if one then started with a million rabbits, the plan "The Rabbitization of Russia" should make itself worthy of the place promised it in the [then current] Five-Year Plan." The scheme was backed by Russian leaders, newspapers and government departments. One million roubles were voted to speed its development, in particular for the purchase of well bred stock.

The Russian Government ruled that use should be made only of tame or "industrial rabbits controlled by the State, to be turned eventually into a profitable source for the export trade as canned meat, sausages, rabbit pies and costly furs." [Izvestia, May 18, 1929 and The Times, June 27, 1930] and also that the Russian people should be made "rabbit-minded." The Ministry

of Education began a widespread campaign with specially employed lecturers on "rabbit-culture" and attractive rabbit keeping films. There was more Press on "rabbit-culture" than on any other part of the Five-Year Plan.

The original farm at Kraskovo became 'The First Rabbit-Culture Settlement' and, unusually, the workers' houses had drainage systems, hot water, electric lighting and heating and a telephone system. The final complement was to be 400,000 rabbits although it started 1930 with only 5,000. The morant hutch system was used, the arks being moved in one direction every few hours for twelve and a half days and then back on a parallel course. Surplus bucks went to meat factories or canteens for factory workers in Moscow.

In early 1930 Philippoff visited England and Germany to buy 'pedigree' breeding stock and four special railway trucks filled with does, from Hamburg, reached Moscow in June, 1930. By mid 1930 there were several State Rabbit Farms, to be used only as breeding centres from which the provincial State Rabbit Farms, the collective farms and the peasants were to be supplied. Countrywide tours were undertaken to encourage rabbit husbandry and supply stock, which were usually refused, [thoughts of a state trap], or eaten. Little progress was being made. The Government then decided it could not rely solely on rural rabbit keeping and ruled that "Every urban worker shall have a rabbit hutch at home and a kitchen-garden...on the outskirts of the town."

In August 1930, Kiroff, second only to Stalin in the Government, published a statement that rabbits could not rescue Russia from food shortage. He subsequently admitted his 'error' and the rabbit's role in the food economy of the Union was restated and that the rabbit was to be given "full rights of Soviet citizenship". The publicity the rabbit received was at this period second only to the Five-Year Plan itself. " Without it the Five-Year Plan would be impossible, for without the food provided by rabbit-culture, the industrial masses would not be able to survive the privations the Plan imposed upon them."

To force the pace of development, the centre of the State Rabbit Industry was moved south and near Sochi, on the Black Sea, some 300 acres were allotted for a new gigantic 'First State Rabbit Farm,' the staff being salaried or wage-earning State employees. The rabbit experts were ordered to deliver at least two and a half million rabbits within a year. An "All-Soviet Rabbit Committee" was formed under the direction of a Deputy-Minister. President Kalinin showed great interest in these schemes and Philippoff was given a further grant to purchase stock from France, the Netherlands and Germany. [Izvestia, June 25 and July 7, 1930]. Rabbit units were established in some convict camps as far north as the Arctic circle and the workers in the rabbit units received preferential treatment. During 1931, some ten million rabbit pelts were used in commerce and many of the larger factories had rabbit meat in their canteens.

In 1932, Philippoff became associated with Professor N.A. Ilyin, who at the time was organising the "Sheep and Rabbit-Moulting Section" of the "Giant State farm". Philippoff was promoted to General Organiser of the quick-maturing meat industry and lectured at the State Scientific Institute of Rabbit Culture [Institute Krolikovodstva], founded in the spring of 1932 near the Udelnaya station some twenty miles from Moscow. This Institute was directed by Professor Polovinkin, assisted by M. Zvonnikoff as Manager, and had some 200 students being trained as rabbit specialists for the provinces. There were also five teams of foragers for green food to supply the Demonstration Farm.

It was becoming generally known that when food shortages were imminent, additional Press activities encouraging rabbit keeping commenced. Izvestia published on April 24th, 1932 a full page eulogy of the rabbit and appeals to potential rearers amongst the public. Severe shortages followed in the winter.

The major rabbit farming centre in North Caucasus, known as Krolikovodkolhozsentr, covered three thousand acres. It was well designed and equipped and produced rabbits by the hundred thousand. Elsewhere, however 'rabbit-mindedness' was lacking. The Government

acted as it had in other branches of State industry. A punitive demonstration was staged with a first trial of "rabbit-wreckers" in Russia. A number of officials were brought before the tribunal, charged with "causing the death of five hundred rabbits." [The Times, May 18 and 19th, 1932].

A further 160 special rabbit farms in the Moscow district and 102 near Leningrad had been ordered for 1932. Philippoff also obtained authority to organise two additional huge State Rabbit Farms. A further sum of 16 million roubles was granted to subsidize rabbit farming, and a Society of rabbit-farmers was founded under Government patronage. Success did not follow. Of the first 9,000 rabbits supplied to the new State Farms, 7,000 died within a few weeks [Izvestia, April 24 and 27, May 11 and 30th, 1932, Socialist Agriculture, April 18th, 1932.] This high mortality rate continued far into 1933, although the nursery farm continued to operate successfully for the supply of breeding stock. Every factory was urged to create its own rabbit farm and many did so. Estimates of deaths from starvation in Russia during 1932/3 vary between 2 and 5 million people. In the Donetz coal-basin, many promising rabbit colonies had been established, but at this period all the stock were eaten by the starving miners. The same thing applied to the Dnieper basin.

In 1934, Philippoff was arrested by the secret police but was released and allowed to emigrate to Latvia. In 1937 it was announced by the authorities that 260 new rabbit farms were being laid out in the Rostoff-Don district. Very little became known after that time.

The American Belgian Hare Craze.

The American Belgian Hare 'boom' which started in the 1890's is of interest in the history of the rabbit, for it was the first instance in which modern forms of advertising rabbit farming played an important part in the rapidity and extent of the spread of that craze. It also introduced new selling techniques; for example, the seller offering to buy back animals produced and hence seemingly guaranteeing a profit to the purchaser.

Belgian Hare farms established in such places as Minnesota, caused uproar amongst farmers in the North-West, resulting in petitions to Congress demanding action and claiming rabbits to be of doubtful food value but without doubt a menace to agriculture. A situation repeated often in other countries.

Finally the craze developed to such an extent, that a buyer from America established the highest prices ever paid for a rabbit in Britain. The then enormous sum of £600.00 was paid for a single Belgian Hare buck, this being the equivalent at the present time, to a sum of over £27,000 The Belgian Hare boom is noticeable also because despite the fact that it was probably one of the worst breeds that could have been selected for meat production, it was the one selected. Probably the confusion which existed as to the Belgian Hare of England and the Belgian Hare of Belgium [certainly much better] and other breeds contributed to this situation.

The Belgian Hare craze collapsed in less than 20 years and closed down when 'the public at large learnt that the Belgian Hare was indeed a rabbit like all others, causing the animal to be condemned and execrated'. [Lantz 1912] in the first U.S. Department of Agriculture Farmers Bulletin dealing with the domestic rabbit.

It is interesting also that one of the leading Belgian Hare breeders in England, Ernest Wilkins, was so encouraged by the interest in its commercial use, that he wrote a book entitled "The Belgian Hare - The Business Rabbit of the World." The first edition was published in 1896 and the second in 1901. The book is now rare and few were sold. Perhaps because only those engaged in the sale of Belgian Hares to the American market could believe the title.

The numerous failures that occurred during this affair [as so frequently since] clearly illustrate again how ignorance, coupled often with avarice, and often also the problem of disease, have caused such a high rate of failure in the rabbit farming world. It was also the clearest possible indication that no livestock industry can be based solely upon the sale of livestock to other breeders. Whilst the Belgian Hare boom was such a disaster, it certainly

helped to establish the present very widespread rabbit Fancy in America.

Post War Rabbit Farming

The interest in rabbit husbandry during the 1939-45 war and the presence of Americans, generated in the rabbit journal Fur and Feather, a knowledge of the then American systems of rabbit keeping.

A number of ex-servicemen men [and women] became enthusiastic about small-holding and some slight movement was made in rabbit keeping for profit. It was, however, the advent of myxomatosis in 1953, with the almost immediate fall in the quantities of hatting fur available and the thought that rabbit meat would need to be replaced, which were probably the most significant stimulants to encouraging attempts at large scale rabbit farming.

The hatting fur industry was a very substantial one, using many millions of skins from English and Australasian wild rabbits and millions more from Europe, which included considerable numbers of domestic skins.

In the case of the Angora, there were only very small scale enterprises, mostly producing wool for home use or as a cottage industry. In the 1980's there was a surge in interest with the importation of German Angoras of commercial type. Until then there were no Angoras other than exhibition type, which however, produced a very fine type of wool in modest amounts.

The first large scale farm, based to some extent on the American wire floor self cleaning system, fairly short litter intervals, but above all pelleted specially designed feeding stuffs, was started in the south of England in 1957. It grew to a unit of some 600 breeding does, using the services of a geneticist and statisticians to control the breeding systems, in order to establish specialist hybrid lines. It was supported by a consortium of a major feeding stuffs manufacturer, the largest meat [and grocery] retailer in the country and an extensive agricultural estate. It was fairly successful but after some years, on change of management it was closed down, after a total life of some fifteen years.

A number of similar but usually much smaller enterprises have been built up since then. Housing has generally become standardized on flat deck systems, usually ad lib feeding, automatic watering, and re-mating from post-partum to 21 day after kindling [the average being probably 14 days].

In 1960 the British Rabbit Council founded the Commercial Rabbit Association, whose members then started to attempt to organise and establish an industry. It collected and published information and commenced an accredited breeders scheme in an attempt to improve the general stock of commercial rabbits and to try to prevent dishonest dealers from selling poor animals at high prices. The C.R.A. brought together everyone with interests in a commercial rabbit industry. The members included producers of meat animals and breeding stock, manufacturers of feeding stuffs, cages and equipment, drug, medicine and disinfectant, a few veterinarians, rabbit processors, meat retailers and so on. The majority of members were very small scale breeders, with probably, on average, less than 30 breeding does and usually most of them had insufficient capital. Many failed.

Although the previous attempts by national bodies to form co-operatives had failed [for example the National Utility Rabbit Club in 1910 to 1921 and the Fur Board Ltd], the C.R.A. after a few years encouraged the formation of rabbit producer groups. These groups were never formal co-operatives but consisted of producers within usually an area of about 30 miles radius. In many cases they acted as bulk buying agents for their members and as collecting points for the rabbits for processing from the smaller producer. The producer group also acted as a forum for discussion and instruction, particularly for the newcomer to the industry. The success of each group depended almost invariably on two or three persons [and in some cases only one] and usually the demands upon their time meant that they retired and the group eventually failed. At one time there were as many as fifty or sixty groups in the country. Almost all the groups had

ceased to exist by the 1980's but one or two still remain.

There are today some well established profitable rabbit farms, but, they are the exception. At most at any one time in the U.K.,there are probably about fifteen hundred commercial rabbit meat producers of which at most 100 establishments could be called professional rabbit farms.In the 1970's the rabbit industry earned itself the nickname of "the eighteen month industry" as a reflection that the majority of people who went into rabbit farming for profit, left within eighteen months or so.

There were several reasons for these failures.

Possibly the most important was that the majority of the entrants to the industry were completely untrained in any form of livestock production. They were often led to believe that rabbit farming was very easy. The literature of unscrupulous dealers in stock proclaimed [and in some cases still today proclaims] that "Anyone can make money by breeding rabbits," and "It's so simple anyone can be successful."

Totally unbelievable by anyone with the slightest knowledge of rabbit husbandry, the exaggerations and lies told by some dealers are unfortunately often very successful.

An example of one major breeder/dealer's advertisement claimed that his 219 best does produced an average of 123 young each in 1 year, whilst on average his best 216 and his worst 216 does together produced on average 91.5 young each in one year. Furthermore, it was claimed that each square foot of rabbit housing would produce over six times as much profit per square foot as the Ministry of Agriculture figures showed was the highest profit per square feet for broiler chicken production. [Norfolk Rabbits Ltd, Attleborough, Norfolk - advertising their "Norfolk Star, a hybrid breeder to breed you profits unparalleled in any branch of agriculture".

Many people investigating rabbit farming saw what appeared to be very profitable enterprises. It did not occur to them that this was often because the proprietors were selling breeding stock to newcomers at very high prices which they were unable to get later for their own animals.

Another major reason was that the newcomer was sold poor quality and diseased animals to establish his farm. With such animals there was no possibility that a profit could be made. The problem of disease, which in many cases was considerable, was not easily met by people of limited or no knowledge or experience.

The final major reason was the difficulty of marketing their produce which is always sold to rabbit processors. The sales income they obtained did not allow a sufficient margin over costs. In some cases this was due to insufficient production [the average weaners sold per doe in many cases reached less than 40]. Food costs were high and winter production, when animals were always in demand, was poor.

The very frequent failures have caused further problems to a rabbit industry in the U.K. The knowledge that these failures occur is passed on to those people who would be able to make a success of rabbit farming. Because of the failure rate, they decide not to enter the industry.

Rabbit has not been a popular meat in the U.K. in recent years, although there are some signs, that the attitude to it is changing. There is certainly a smaller per capita consumption than anywhere else in Europe. The attitude towards animals [particularly those that are not totally recognised as producers of food] militates against the use of the rabbit as meat.

The effect of what might be called the Cuddly Bunny syndrome, at least in England, on the development of the commercial rabbit industry has been unquantifiable but great. The idea of the clever, pretty, little rabbit as a friendly, rascally but lovable character, has very frequently become implanted into the mind first of the child and then of the adult. The nursery bunny doll, beloved of so many children at an age when they are most impressionable is one of the most popular of all childrens' toys. Strangely, in other countries where to a large extent the rabbit is recognised in the same way, the effect on the meat rabbit market appears to be minimal.

Allied to this there is the situation which occurs as a result of the pet rabbit. This

phenomenon started in the Victorian era but continues today. A surprising percentage of entrants into the commercial rabbit industry, albeit on a small scale, do so in the certain knowledge that 'young boys keep rabbits. Obviously therefore it is very easy.'

Commercial rabbit farming is not easy and requires talents, knowledge and expertise, and if the sole background of a new entrant is the knowledge of pet keeping, his failure in rabbit farming is certainly partly explained.

Having said this, there are perhaps indications that there is today the possibility of establishing a commercial rabbit industry in the U.K. There is increasing recognition by the public of the value of rabbit meat, the thoughts of myxomatous rabbits are fading and super markets in many parts of the country carry domestic rabbit meat on their shelves. Whilst the summer demand is easily met, indeed there have been in the past gluts at that time, the winter demand cannot be met by existing producers.

Myxomatosis and Viral Haemorrhagic Disease.

The rabbit is subject to two notorious diseases, myxomatosis and VHD,both of which have features of interest in common. Myxomatosis was the first virus disease of animals described and so attributed and VHD is certainly amongst the last. Both have moved through the world at a quite astonishing rate. Both have attacked the wild rabbit and the domestic and both have became better known to the public in many countries, than probably any other animal disease. The case mortality in both diseases was at first very great. In the early stages of myxomatosis only 2 animals per thousand infected, lived. The case mortality in VHD is not so high, but the disease kills even more quickly. In the case of VHD the disease is of too recent origin to have much of a history, but myxomatosis has a fairly long and interesting one, described in detail by Fenner and Ratcliffe [1965] in their fascinating monograph on the subject.

First described by Sanarelli in 1898 it occurred very occasionally in domestic rabbits in South America and then in 1930 it occurred in a rabbit farm on California. Since then sporadic outbreaks have occasionally occurred there.

The history of the attempts to use myxomatosis as a biological control weapon against rabbits in Australia starts in 1919 when it was first suggested to the Australian Government. Bearing in mind their previous tremendous search for such a control measure it is surprising that they should have turned down the idea because of the size of the trade in meat and skins and public antipathy to the idea of giving animals diseases. It was, however, considered in 1924 but no action was taken until Sir Charles Martin [1936] was asked to investigate its potential for control. He concluded that it might be suitable for local control. Martin did not, however, obtain evidence that the disease would spread from one colony to another. Further work again failed to obtain this result due possibly to the fact that the role of insect vectors was unknown and the island colony used for the trials was almost mosquitoes free and the rabbits, unusually, had no fleas.

Following the discovery that the disease was insect vector transmitted and a series of trials most of which were disappointing, with a failure of the disease to pass from one colony to another, Bull and Mules [1943] wrote"...myxomatosis cannot be used to control rabbit populations under most natural conditions in Australia with any promise of success." Increases in the rabbit pest lead, in 1949, to renewed efforts to spread myxomatosis in the Murray valley. The disease remained localised until December 1950, when it started to spread very quickly with huge reductions in rabbit numbers and has continued since then.

Myxomatosis was deliberately introduced into France by Dr Armand Delille in June 1952. He inoculated 2 wild rabbits only on his estate. From this simple act the disease spread with the same spreed throughout Europe. In France by October 1953 myxomatosis amongst domestic rabbits had increased until it was present in over 5•6 thousand communes and in 1954 official estimates put the deaths amongst domestic rabbits as 30-40 %, which would have meant a

figure in excess of 50 million. Deaths of course reduced considerably in later years, partly because the disease reservoir amongst wild rabbits grew much smaller with their decimation, partly because the virulence of the virus in many cases became much reduced and partly because of the adoption of preventative measures.

In France there were three lobbies concerned with myxomatosis. On one side there was the farming community which generally welcomed the disease and on the other both the rabbit chasseurs [or hunters] and the domestic rabbit industry. In England there were only two, the agricultural community and the domestic rabbit interests which were a great deal smaller than those in France.

When myxomatosis entered the U.K., in October 1953, it was welcomed with delight by most of the farming community who had suffered enormous damage from the rabbit. Its spread was certainly assisted, illegally, by some farmers and within two years there were very few areas which had no outbreaks. By 1955 over 90% of all wild rabbits in the country had been killed.

Strangely, the mortality in domestic rabbit in the U.K. was very low. As a percentage of the total domestic rabbit population the rabbit deaths, even in the years of the highest incidence, were certainly less than 1 %.

In November 1953 a Myxomatosis Advisory Committee was appointed by the Minister of Agriculture and the Secretary of State for Scotland to advise the Government on matters relating to the disease. Two reports were published.

The question of the artificial spread of virulent strains of the disease to control wild rabbits in areas where attenuated strains became common, arose. One argument put forward was that when, not if, attenuated strains of the disease appeared, there would remain wild rabbits and therefore a reservoir of infection for all time against which the domestic rabbit would have to be protected and future generations of wild rabbits would die of the disease. The problem for domestic rabbit breeders might be reduced if the Government retained the right to spread virulent strains in such circumstances to eliminate the reservoir of disease

The public debate on the spread of any strain of myxomatosis was in many cases violent. Fenner [1965] states that "Out of respect for public sentiment, the committee recommended that myxomatosis should not be deliberately spread." In fact, the Committee recommended this on technical grounds alone. A small minority of that Committee strongly advised that its use by the Government should be permitted. This was rejected by the Ministers concerned, not on technical grounds, but as being politically inexpedient.

The Growth of Associations and Other Establishments.

The rabbit husbandry world is given to the formation of Associations. In addition, there are a number of centres of research, teaching and performance testing bodies.

In all countries where rabbit breeding is conducted, there are usually National Associations for both the exhibition and commercial sides of rabbit husbandry. The Fancy national associations, older by far than the commercial associations, often have affiliated to them breed specialist societies which promote their particular breeds of rabbits, and clubs or groups of rabbits breeders in the same area, often with the addition of Agricultural Societies.

For example, in the U.K. at the present time, there is one central body, The British Rabbit Council, which has affiliated to it 43 national specialist clubs, 87 area specialist clubs and just under 200 local rabbit clubs, over 70 Agricultural Societies and a few other types of organisation. In addition it has something over 6,000 individual persons who join as direct members. Most other countries have similar groupings. The very earliest society devoted solely to the exhibition of rabbit was founded in London in 1840 and was known as the Metropolitan Fancy Rabbit Club.

The British Rabbit Council was effectively founded in 1918, at the start of the fur rabbit

industry. It was concerned not only with exhibitions, but also with the scientific aspects of rabbit husbandry and the commercial use of the rabbit. In 1960, the commercial aspects were transferred to a newly formed Commercial Rabbit Association, which today consists of direct members only.

It is fairly common in all countries, that, certainly until the associations become strong enough, there are break away groups, and thus two almost identical bodies are formed. This inevitably leads to a weakening of the interests of all concerned with the inevitable result that the costs to, and therefore the effectiveness of, the organisations is greatly diminished. This, in fact, is what occurred in 1980, with the break away from the Commercial Rabbit Association of the larger rabbit farmers, to form the British Rabbit Federation. After a period of nine years, wiser councils prevailed and the two bodies merged to form the British Commercial Rabbit Association. Almost invariably, all national bodies are under funded.

There are two supra, or multi-national bodies for rabbits. One is the World Rabbit Science Association. The other is the European Association of Aviculture and Rabbit Breeding, established in 1938 [E.E.A.C.] and concerned solely with exhibitions organisations. It has membership from 14 member countries. In 1922 the World Poultry Science Association was formed and held congresses every four years, at the first few of which, rabbits were included as a section. The W.P.S.A. was founded for professional breeders and scientists, the. E.E.A.C. was founded for the exhibition breeders of poultry, pigeons and rabbits.

It is a fair illustration of the past difference between the poultry industry and the rabbit industry that the professional and scientific multi national organisation for poultry was founded as a first such organisation, but that for rabbits was founded nearly 40 year after the first such organisation for exhibition rabbits.

Apart from associations of rabbit breeders there are, or in many cases have been, other types of establishments of importance. These include research and teaching establishments, both official and commercial.

For examples, in France there is the Institut Technique de l'Aviculture and the Rabbit Husbandry Research Laboratory of the Institut National de la Recherche Agronomique, both certainly leaders in their fields, and in Spain there is the Real Escuela Oficial y Superior de Aviculture and others.

Again as examples, in France the Association Francaise de Cuniculture publishes much valuable material, as does also the national organisations of Spain and Italy and other European countries.

In the U.K. the teaching/research establishment for rabbits [which was part of the National Institute Of Poultry Husbandry situated at Harper Adams Agricultural College] did excellent work between its foundation in the 1920's until its closure in 1966. Although other research has been conducted in the U.K., this has been scattered and, of recent years, very scarce. Attempts to found an Institute of Rabbit Husbandry in England date back some 80 years. There have been several such attempts each of which has been foiled by stupidity and ineptitude, greatly helped by bureaucracy !

There are other types of establishment of importance to rabbit husbandry.

In France, the establishment of The Conservatoire National des Animaux de Basse-Cour, with official help, in 1979 for the conservation of those breeds in danger of extermination was a notable step forward. There has of course been the Rare Animals Association in England which has the same objectives but does not cater for rabbits.

There are also the national testing stations. In England during 1928 and the following years attempts were made to establish an Angora Wool Testing Station. Although strongly supported by both the Angora producers and leading scientists such as Professor F.A.E. Crewe and Sir John Hammond these efforts were unsuccessful.

One of the first national testing stations [for Angoras] was established in Germany during the 1930's and its success can be gauged by the considerable improvements in the yields of

wool which have been established since then, quite apart from the great amounts of research information that have been produced.

In 1944 the Danish progeny testing station was established at Favrholm but changed its emphasis in 1963, when male testing was undertaken together with research projects.

Only one company in Great Britain [British Oil and Cake Mills] has ever undertaken any considerable amount of research to assist in the development of a commercial rabbit industry. This company was one of the first to become involved with the production of compounded feeds for rabbits, established its own rabbit research station in the early stages of the development of the post war industry and amongst other activities conducted many trials on various aspects of rabbit husbandry, including trials for the improvement of meat strains. They also assisted with the early carcase trials established by the C.R.A. in England, in which animals were first assessed alive, processed and then measured against various indices of quality, before being finally judged as meat carcases for sale.

Finally mention must be made of the Oregon State University Rabbit Research Centre and its publication, The Journal of Applied Rabbit Research. The centre itself provides facilities for research but in addition, in the same way as the Fontana Rabbit Experiment Station tried to do without a regular publication, it provides not only a specialist rabbit research journal but also a journal for those whose need is greatest, the producer. This is a direction which is not frequently taken. Since its inception in 1987 its Journal has provided a forum and fund of knowledge which can be shared by both scientist and producer.

There are, then, a considerable number of establishments and associations interested in and indeed devoted to, rabbits. A good deal of the work of many of them is duplicated unnecessarily and regrettably in many cases there is little or no contact between many of them.

The U. S. Department of Agriculture Rabbit Experiment Station at Fontana, California.

Fontana was one of the first experiment stations devoted entirely to rabbit husbandry research and it seems appropriate, at what could, gratefully, be called its successor, to consider it in a little detail [Templeton, 1953-58]. It was founded in early 1928 by the Bureau of Biological Survey, one of their interests and concern at that time being the rapid depletion of wild furs, and what domestic alternatives could be found. Frank Ashbrook, the author of several books on the rabbit, was responsible for fur resources in the Wildlife Resources Division of the Bureau. It was he who selected California, persuaded the Fontana Farms Company to develop, at their own expense, the five acre citrus grove with buildings and rabbit cages, and to lease it to the Government at a peppercorn rent. It was purchased by them later. After 13 years the Bureau of Biological Survey was merged with the Fish and Wildlife Division who were responsible for the unit for another six years until it was transferred to the U.S.D.A. in 1946. After the first 2 directors [Monro Green and J.W. Meyer] George Templeton, was appointmented Director in 1934. It is his name which has became synonymous with Fontana.

Templeton, having graduated in animal husbandry from Missouri University in 1911, at the age of of 24, taught that subject at several universities, specialising in animal nutrition. He was also at different times, Head of the Animal Husbandry faculties of three of the Universities.

The usual staff at Fontana numbered 7, but, being closely associated with Beltsville Agricultural Research Centre in Maryland, had considerable other assistance available. At different times research staff included Drs. K. Hagen, F. D. McKenny, E. R. Vail, and E. E. Lund.

Whilst much of the early work was concerned with rabbit skins, work on nutrition increased greatly with the coming of George Templeton. Throughout the whole of the period of his administration, one of his main interests centred around enteritis in its various forms.

By the 1940's the unit had some 400 breeding hutches in various buildings, with an isolation unit, a small slaughter house and a general administration building which also

contained several laboratories. The original hutches had been the standard wood and wire mesh type in two and occasionally three tiers, under a shelter roof, but these eventually changed to two tier suspended wire cages.

George Templeton remained as Director until January 31st, 1957, when he retired. He died in 1970. The Fontana station continued under the Direction of Dr Robert B. Casady for some years and was eventually closed down in the 1960's. Partly to raise funds, in 1958 the first Rabbit Fryer Contest was held, for litters produced by does sent to the unit. The contest unit could hold 120 does with litters, but this first test had less than half that number. The top ten litters had an average live weight of 34.2 lbs, with a feed conversion of 2.77, whilst the best litter weighed 40.5 lbs with a feed conversion of 2.44.

Attempts in 1958 to re-allocate the $60,000 annual budget for Fontana to another project, thus closing the station, were foiled and the unit continued a few more years.

The work at the Station, after its first essays into furs and skins, concentrated almost entirely on meat rabbit production. The research activities were classified, certainly in the later stages, under two separate divisions of the Agricultural Research Service of the USDA: The Animal Husbandry Research and the Animal Disease and Parasitic Research Divisions.

Nutrition was certainly one of the main subjects studied and contributed to the development of pelleted feeding stuffs, the development of standardized nutrient requirement information and the development of improved feeding practices. In the management field, the development of palpation technique was important, together with studies on sore hocks, pseudopregnancy, the inheritance and elimination of malocclusion, "wooliness" and yellow fat, slow wool growth in Angoras, the composition of meat rabbits, and the rational design of some types of equipment and other subjects. Many different disease conditions were investigated, but always the major pre-occupation was the enteritis complex. A great deal of excellent extension education was carried out.

The history of the Fontana Station and its work illustrates certain points which have so often been repeated in the rabbit world. Firstly the sometimes cavalier attitude of Governments to research and education to help in the establishment of a rabbit industry and to assisting with the supply of desperately needed knowledge. Whilst the station was founded by the enthusiasm of several scientists, it was closed down for what amounted to paltry reasons.

The most important lesson was, however, the way in which the station's work and the publication of the results were directed to those for whose benefit to a large extent the work was done.

In one of those disasters which appear to so often occur in rabbit circles throughout the world, many of the records of the Fontana station were destroyed. All that remains are copies of the numerous papers that were published by the staff.

The Re-discovery of Caecotrophy.

There are two matters in the history of the rabbit that illustrate important points in the literature of, and hence the study of, the rabbit. The first is the discovery of the first detailed study of caecotrophy fifty seven years after its original publication.

The study of caecotrophy [or coprophagy as it was then called] by Morot, the publication of his research in 1882, and the subsequent lack of recognition of its existence until 1939, is a good example of what has occurred, not infrequently, in the literature of the rabbit.

Charles Morot, a French veterinarian, published his paper [of 101 pages] on [The stomach pellets of Leporides, their origin , their nature, and their role] in 1882, after an exhaustive series of experiments.

There were, prior to Morot's paper, many suggestions that stomach pellets were to be found in both rabbits and hares, and after his paper the same observations [or that fecal pellets were taken directly from the anus], were made by several authors, Drane, 1895, Wille, 1903,

Grutzner, 1905, and others. It was not however until after 57 years, on the publication of a paper by Madsen, [1939] that the full importance of Morot's work was revealed.

Taylor [1939] in an appendix to Madsen's note summed up the situation by commenting that: "the food pellets so described must be familiar to all laboratory workers who have occasion to open the rabbit's stomach"; that "the explanation given...was new to us and at first we were inclined to regard it as too fantastic for serious consideration," and after his own confirmation of the facts, that "This point in the special physiology of the rabbit is of considerable significance for the correct interpretation of metabolism experiments...and...the observations...will invalidate some and perhaps many of the conclusions that have been arrived at in past metabolism experiments on this animal."

The Leporid and other Myths.

The second matter in the literature of the rabbit, referred to above, is the history of the leporid. It is certainly unfortunate, and confusing, that such a name should also have been given to a myth when it so closely resembles the generic name. The history is the reverse of the discovery of Morot's paper in one way but it is certainly the same in that the truth was eventually discovered. It differs in that the volume of literature on the subject was great. It also included elements of a gigantic fraud.

For nearly 150 years it was believed by many, and sometimes with the strongest passions, that the rabbit and the hare when mated produced young of a type slightly different from both parents. It was believed that the Belgian Hare was indeed derived from such a cross. Even in the days when it was known that the chromosome number of the rabbit was 44 and that of the hare 48 it was averred even by geneticists that the interspecies cross had been seen by them. The evidence it was said was absolutely certain.

The existence of the leporid, and indeed the name, was first announced by Paul Broca[1858], who stated that he had examined a number of animals produced by a cross between hare and rabbit by one A. Roux , President of the Agricultural Society of Angouleme. These crossbreds had been produced since 1847 up to the fourth generation. Crosses back to the original species were also obtained and in 1858 Roux sold "about one thousand" on the local markets. P.Broca, [1858] and Gobin [1874].

No matter that the differences between hare and rabbit were numerous, size, gestation period, fecundity, state at birth [eye open, furred as against the reverse], and many more, these were ignored and it was a number of detailed osteological studies which provided arguments for and against the mythical hybrid.

Darwin [1888] considered that the cross was "possible, though not probable", but Haeckel [1874] being certain, took the opportunity to name the 'new species' Lepus darwinii.

Any number of papers were presented to learned societies, for or against the existence of leporids for some forty years, but, although the argument tended to die out after the turn of the century there were still people who were convinced that the cross could be made. Hagedoorn [1962] an internationally known animal breeding scientist, maintained until his death in 1953 that he had produced leporids. He described them in detail and admitted that he could not account 'for the failure of his colleagues to produce leporids'.

The debate was eventually terminated by attempts to breed the two species by artificial insemination. All attempts failed [Adam 1957] and others.

In addition to the sincerely held but mistaken beliefs in the Leporid there were of course the statements that existed for fraudulent purposes. Although fraud is not uncommon in the rabbit world, some of the frauds perpetrated have been remarkable. There has been the mounting of small roe deer horns on rabbits [although more usually on hares] and there has been the [rabbit] fur coated trout [to protect it from the cold ?], but probably the most remarkable, which was certainly done with the greatest skill was the Hooded Rabbit.

The Royal Society, at that time the most prestigious scientific society in the world, has written in its Journal for July 8th, 1736 that "A strange nameless Animal brought from Moscovy was shown to the Society. It was of the Shape and Make of a large Hare; and sat in the same manner: but was provided by Nature with an uncommon defense against the injuries of Cold. For it had a loose Hood or Cowl hanging down behind its Neck, and round its breast, into which it could up on occasion thrust its head and legs: there being a breathing hole in it for its nose and another for the Eye. It had likewise Sockets of hare skin hanging loose at the hinder part of the feet, which it could draw under the Soles like so many Socks." Unfortunately it has been impossible to establish whether the animal was alive or a dead specimen, but the indications are that it was a preserved object. A painting by Edwards,obviously drawn from the same specimen, illustrates this animal and below is written approximately the same details but adding that "This Rabbit is about the bigness of our largest tame Rabbits in England." and that the hole in the cowl is for light when the head is inside. It also adds that "It was acknowledged [by the Royal Society] to be natural".

Dickson [1824] comments that the hooded rabbit is well known in the West Indies "and has, most probably, been originally the produce of of a stock, transported thither from some other part of Europe...It is...termed the Russian rabbit, but which is absurd, as it is wholly unknown in that extensive empire."

These frauds and so many other mistaken beliefs become embodied in the literature of the rabbit and constant repetition only re-enforces the belief in them. For example, as early as the seventeenth century advice was often given that the hutch rabbit should be given no water. Indeed, it was often said that drinking water would cause disease and death. This is all the more surprising as quite often at the same time the use of green foods and roots were thought to be neither necessary nor wise. This same situation, but when green foods were recommended, continued at least in the U.K., until a surprisingly short time ago. Certainly in the 1950's there were a number of well known breeders who considered the use of drinking water to be positively harmful.

The Literature of Rabbit Science and Husbandry.

Because of the many different uses and aspects of the rabbit, the literature concerning it is extremely widely scattered throughout the journals and books of the world. Much of it is often very difficult to trace.

Although there have been many most excellent reviews of current knowledge [that is to a large extent the literature] in many fields, not the least of which have been published in the proceedings of the W.R.S.A. Congresses, there is much more, particularly of the older material, which has not been known to those who are interested.

In many cases the correlation between the country in which a paper is written, and the languages of the countries of origin of the references cited, indicates how real is this problem.

There is no doubt that there is more knowledge lost [or hidden], or awaiting analysis, combination and application than has ever been reviewed or applied, or indeed in the majority of such cases, used.

There have been a number of bibliographies published on material on different aspects of the rabbit. A few examples representing some of the more important bibliographies at the time of their publication may be listed as below.

Author	Year	No. of Refs.	Subject
Imp. Bur. Anim. Genetics.	1931	378	Genetics and Sex Physiology
Herman	1941	4859	Rabbit in disease Research
Moebes	1946	503	General, much exhibition
Makepeace	1956	3485	General
W.R.S.A.	1978	353	Rabbit diseases [1974-1977]
Com. Agric. Bureau	1980	2161	Rabbit Diseases [annotated]

There are at least 50 other bibliographies relatively easily obtainable, dealing with various aspects of the literature of the rabbit, but the references/abstracts are duplicated a great deal. One can compare these with Weisbroth et al [1974] who refer to close on 3000 papers on the biology of the laboratory rabbit and the 660 papers on Genetics of the rabbit referred to by Robinson [1958].

Apart from literature there is the difficulty of finding much other information. It is true that some organisations, for example A.F.C. in France, and the Guide Orsol in the same country but commercially, and in Spain, the Real Escuela de Avicultura, publish directories of information. A National Committee of both Canadian and U.S. Departments of Agriculture published in 1989 a Rabbit Resources Manual, which list a great deal of directory information. But these are exceptional.

There have, in the U. K., been the loss in recent years, of whole collections of material of great value. Three major such collections, built up over at least 40 years by people in exceptionally favourable situations to do so, have been destroyed for want of guidance or some place to store them. In each case most details of their contents werealso lost. In America much irreplaceable literature was taken from the American Rabbit Breeders Association and lost. The records of the Fontana Rabbit Experiment station were destroyed.

In general bibliographical work, the use of computers and copiers has had a tremendous effect on the ease of obtaining material. However, work, particularly on the rabbit, published prior to fifteen or so years ago has not, to a large extent, been included. In many cases also, papers of value are not abstracted or recorded by such bodies as the CAB International, they being published in journals or books not reviewed by that body. A list of abstracts of papers on the rabbit abstracted by CAB, for example, has averaged, including miss hits, just over 800 papers per year, whereas the known figure of material is very much higher.

This situation is made worse by other factors. The first is that there is a rapidly increasing volume of literature on the rabbit. Secondly the more specialised the disciplines become, as they do, the wider is the understanding of the different disciplines that is required. Finally, the problems that exist or arise in the husbandry of rabbits for whatever purpose are most usually multi-factorial and multi-disciplinary and require multi-disciplinary resources to solve them.

An important need, then, is for easier access to the literature, of necessity much in abstracted form. The ability to obtain, from one source only, a detailed list of previous work on a particularly subject would be of inestimable value and saving in time to the workers in rabbit science. In fact the combined efforts to produce such a source would be a good deal less than the time needed by research workers separately to produce their own, and, as a continuing source, would become increasingly valuable. Experience of the past indicates that such an operation is very unlikely to be undertaken or financed by any Government. It is a task which is too great for a small group of individuaLs, except perhaps in a very restricted field. It is, however, perhaps a task which might well be organised by the World Rabbit Science Association.

Acknowledgement

A work of this nature must inevitably owe much to many different sources and authorities. The listing of all would entail a great deal of repetition and would become unnecessarily burdensome. Furthermore, much of the more recent material has arisen from discussions with numerous people interested in the rabbit. References are only cited, therefore, for the more important works and sources.

There are certain works of major importance to which acknowledgement should be made. These are essential modern works for the serious student of the Rabbit and include Barrett-Hamilton [1910], Ethnozootechnie, Society of [1981], Fenner and Ratcliffe [1965], Sheail [1971], and Thompson and Worden [1956],

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NOTES ON THE HISTORY OF THE RABBIT

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Summary

Some aspects of the history of the rabbit, both wild and domestic, from antiquity to the present times are briefly surveyed. Points of interest, including the spread of the rabbit by man, the development of myxomatosis as a control measure for wild rabbits and its effects, the relationship between the rabbit farmer and the rabbit fancier, the evolution of new breeds of domestic rabbit, the use of the rabbit in times of scarcity, attempts to establish a rabbit industry in the United kingdom over the past 150 years, Russian early attempts at rabbit farming, the American Belgian Hare boom, the growth of Organisations and Associations within the rabbit world, with notes on the American Rabbit Experiment Station at Fontana, the re-discovery of caecotrophy and myths in the rabbit world, are used to illustrate the variation of interests in the rabbit which exists. This great diversity results in publication of material in innumerable journals and books, many of which are extremely difficult to trace.

Comments on the literature of the rabbit are added and the question posed as to how the literature, both past and present, in any particular field may be more effectively obtained and utilized. It is suggested that the World Rabbit Science Association might consider the organisation of such an undertaking.