

BERKERY

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THE HIGH COURT

No. 6512 P. 1980

BETWEEN:

JAMES BERKERY

Plaintiff

and

HENRY FLYNN

Defendant

Judgment of Mr. Justice Costello delivered the 10th day of June 1982.

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INTRODUCTION

The Plaintiff owns and occupies a farm of about 155 acres at Knocksouna not far from Kilmallock in the County of Limerick where he lives with his wife and family and on which he has carried on a successful dairy farming business. His claim is that the Defendant has polluted a well from which he derives a water supply which he uses both for domestic purposes and for his farming business. He instituted these proceedings on the 27th of July 1980 claiming injunctive relief and damages and on the 30th of July obtained an interlocutory order which was to remain in force pending the trial of the action. The Defendant is the owner and occupier of a neighbouring farm on which he too engages in dairy farming. The Plaintiff's case is that the Defendant erected a slurry pit in his farm-yard in the winter of 1976/77 and that the overflow from this slurry pit has been a source of pollution because it entered the ground water system which feeds his well. A second source of pollution has been, the Plaintiff says, an outwintering unit on the Defendant's lands on which large amounts of slurry accumulate in the winter months and from which pollutants enter the same ground water system. These

allegations are strenuously denied by the Defendant who has called expert evidence to establish that neither the overflow from the slurry pit or ^{from} the outwintering unit could possibly have contaminated the well. The debate between the geologists has been intense, the area of disagreement between them very large, and their conclusions diametrically opposed. As in other cases in which experts disagree I must examine the facts of this case in some detail to see what assistance can be derived from them in resolving the technical aspects of the case. I propose, therefore, to begin this judgment by examining the evidence relating to the pollution of the Plaintiff's well. I will turn then to the operations carried on by the Defendant of which complaint is made; and finally I will consider the geological evidence adduced by the parties.

The pollution of the Plaintiff's well

The Plaintiff's well (which can more accurately be called a spring) is situated in a large field which has been divided into three parts by the Plaintiff by means of wire fencing. It is not far from the Loobagh river which forms one part of the

boundary of the large field to which I have referred. The field slopes upwards towards Knocksouna hill. In a direction roughly westwards of the well the Defendant's farm buildings are situated. These comprise housing and feeding facilities for a dairy herd, a milking parlour, calving down pens, and calf housing. Manure is stored in an overground tank referred to sometimes as a "slurry pit" and sometimes as a "dungstead". The slurry pit is 48 feet wide and 63 feet long with an average depth of 4 feet. There is an ope at the rear of it which is closed by means of railway sleepers whose purpose is to allow drainage from the tank into the channels surrounding the pit. There is a soiled water tank of an estimated capacity of 330 gallons and water which is used to clean out the farm-yard buildings and farm-yard travels in channels and drains into the soiled water tank, as does seepage from the slurry pit through the sleepers. The contents of the soiled water tank are pumped through a movable pipe to different parts of the Defendant's land. The yard is on elevated ground and the slurry pit is in fact about 50 feet above the level of the bottom of the

Plaintiff's well and 533 yards from it.

The outwintering unit on the Defendant's land is closer to the Plaintiff's well. It comprises a concrete slab on which silage is made and on which cattle congregate at feeding units. The capacity of this slab is about 250 tons. The stock feed at the face of the silage and also from silage bins located on the feeding area. The feeding area is cleaned by a scraper mounted on a tractor. There is an unlined earth wall manure storage area, referred to as a "lagoon". This slurry lagoon has no formal drainage facilities and drying out is achieved by a combination of evaporation and drainage into the ground or through the banks of the lagoon. The lagoon is about 260 yards from the Plaintiff's well and about 60 feet above it.

The Plaintiff has carried on a dairy farming business on his farm for about 20 years and for the past 18 years or so has used the well as a water supply. He began by using it to water his lands and extended its use each year. He installed an electric pump in a small pumphouse beside the well and from this water was pumped to his dwelling and milking parlours. In

addition water from the well is piped to troughs in his fields and at present he has about 17 troughs throughout his farm. His herd comprised between 68 to 72 cows and about 30 heifers. He is a pedigree breeder and has won many awards. His wintering season for his cows is from about the 10th of November to the 1st of April each year and ^{that} for his younger cattle from the 1st of December to the 1st of April. He has no outwintering unit and during his winter season his cattle are kept indoors. The field in which the well is situated is a large 30 acre field divided, as I have said, by electric fencing. There is now a fenced area of about one and a half acres in the vicinity of the well. He grazes about four to five cattle in the vicinity of the well, but not continuously, in the summer season. It is a feature of some significance in this case that during the winter season there are no cattle in the large field or near the well and in the summer months there are no cattle in its vicinity between the 1st of August and the end of September. The pumphouse and well are surrounded by an electric fence which the Plaintiff built in the early autumn of 1978.

The first time that the Plaintiff was troubled with pollution was the summer of 1978. He then for the first time noticed that the water from the taps was dirty in his milking parlour as well as in his dwelling house and it smelled of stale cattle manure. So he stopped using the water supply immediately and had to draw water from a neighbour. But the pollution continued and he noticed that the condition of his water was associated with the weather - if there was a dry spell the condition cleared up but after heavy rain the water supply again became polluted. At this time there were long periods when conditions were normal and the Plaintiff hoped that the problem would clear itself. He did not know what the cause of the trouble was but took the precaution of putting an electric fence around his well in case his own cattle were responsible. The condition, however, got much worse in the winter of 1978/79 even though he had no cattle on his land from the beginning of December 1978 and pollution continued throughout 1979 and into the year 1980. During this period the Plaintiff obtained water from a neighbour and also from his local co-operative.

Matters came to a head in the summer of 1980. On the 1st of June of that year, after a period of heavy rain the Plaintiff experienced a "terrible foul smelling odour" from the water. It was, he said, the worst he had ever experienced. He described the smell as a mixture of stale slurry and silage and although questioned closely on the matter he remained adamant that the water smelt of silage. He stated that he knew that the Defendant had made silage on the 22nd of May previously because he had seen the machine in the Defendant's field, and that neither he nor his neighbours had made silage at that time. As the bad smell continued he decided to go and see the Defendant about the matter as he began to suspect that the Defendant might be responsible for what was happening. Silage, he explained, is cut and put into a shed where it is pressed down and rolled by means of a tractor. The juices from the cut grass are forced out and would flow into the Defendant's yard for perhaps six to eight weeks after the silage was originally cut.

On the 3rd Sunday in June, the 15th of the month, the

Plaintiff visited the Defendant. He again visited him on the following Tuesday. There is some difference of recollection between the parties as to what occurred and I am satisfied that the Plaintiff's version is the correct one. He explained to the Defendant that his well was polluted with silage and slurry and that he believed that the pollution must be coming from the Defendant's yard because he was the only person making silage in the neighbourhood. Having initially taken up a somewhat belligerent attitude to the Plaintiff (because he had crossed uninvited into his lands) the Defendant then adopted a more reasonable stance. He referred to the fact that he knew about the problem of pollution as he had inadvertently polluted his own well and he then walked to his slurry pit with the Plaintiff. The Plaintiff noticed that the channels around the railway sleepers at the rere of the slurry pit were choked with weeds and solid slurry and that the land at the back of the slurry pit was like a quagmire and he could see that fluid from the slurry was not able to flow into the channels, and he pointed out these conditions to the Defendant and suggested that they could

be the source of the pollution. The Defendant would not agree, but in the course of their discussion he commented that the slurry pit had not been a success. The Plaintiff remembered that on a previous occasion the Defendant had said to him and to other farmers who were looking at his new disposal system that in normal conditions it was a "good job" but that in heavy rain there would be an overflow, and he suggested to the Defendant that he might consider getting a bigger tank to catch the overflow and pump it out from time to time. The Defendant agreed to do the best he could to stop the spread of the silage and the slurry over the ground and the Plaintiff explained to him that he had got no advice about the matter and he thought that it would be best if it could be settled between them on a man to man basis.

On the following Tuesday the Plaintiff called again to the Defendant. He saw the slurry pit and noticed that the Defendant had cut some of the weeds and had made some attempt to sweep the channel. But when he met the Defendant the Defendant was very abusive, apparently because the Plaintiff had entered the lands and viewed the slurry pit without the Defendant's

permission. He refused to come to look at the slurry pit or to visit the Plaintiff's house to see the pollution and adopted the attitude that if the Plaintiff thought that he was polluting his well the Plaintiff would have to prove it. And so matters were put in train which have led to this hearing. Two days after their meeting the Plaintiff consulted his Solicitor and after obtaining advice on the matter from an engineer, Mr. Brennan, the Plaintiff's Solicitors wrote on the 15th of July 1980 formally complaining that the Defendant was responsible for the pollution of the Plaintiff's water supply. The Defendant's Solicitor replied on the 18th of July denying the allegation and stating that "our client has had comprehensive geological and scientific surveys carried out." This was a considerable exaggeration of the quality of the advice the Defendant had obtained; he had, in fact, consulted two water-diviners (one of whom divined water by looking at a map) and neither of whom gave evidence at the hearing. On the 30th of July I made an order against the Defendant to restrain the acts of nuisance complained of until the trial of the action.

There was an improvement in the conditions of the Plaintiff's water in the month of August 1980 during a spell of fine weather, but on the 10th of October serious pollution occurred again. This time the Plaintiff was quite satisfied that there was no smell of silage but the water contained a smell of stale cattle slurry. After that every time there has been heavy rain pollution occurred. Visually the water was dirty and this remained the situation during the winter of 1980. In that winter the Plaintiff as usual took all his cows off the land on the 10th of November leaving 15 heifers outdoors until the 1st of December; not, however, in the paddock where the well was situated, but further up the hill. During the spring and summer of 1981 conditions were more or less the same and the Plaintiff has calculated that about 36 hours after heavy rain the pollution would be noticed in his kitchen. Similar conditions existed into the autumn of 1981. In the winter of 1981 the Plaintiff noticed that there were much more cattle on the Defendant's outwintering unit and much more silage there than in previous years. After Christmas of 1981 the pattern of pollution changed. From then

the water has been dirty all the time, and the pollution obviously more serious. This is the situation at the present time although the water shows some signs of improvement after long dry spells.

Before considering further the evidence relating to the pollution of the Plaintiff's well there is one suggested source to which I should refer. The Plaintiff was asked about the overflowing of the Loobagh river. I have no difficulty in accepting his evidence and concluding that this happens very rarely. When it does the overflow from the river does not go near the well. It lies below the well and in a situation where it could not possibly contaminate it.

I turn now to the evidence of Mr. Brennan who is a civil engineer with considerable experience of advising clients in agricultural areas on water supply problems. He carried out his first inspection on the 26th of June 1980. He found that the water in the Plaintiff's sink in his kitchen was foul smelling and discoloured. He inspected the well and took photographs and found that the water in the well was visibly polluted and had a

foul smell. He examined the ground around the Plaintiff's well and found that it was dry; there was no evidence of pollution from the Plaintiff's own animals and no sign of animal manure in the area. There was he could see considerable outcropping of rock on Knocksouna Hill and Mr. Brennan concluded from his experience that the hill was a limestone hill. From his knowledge of limestone and the ground water systems it can produce he formed the view that the pollutant could have its origin on the hill. He drove his car to the Defendant's farm yard and saw the slurry pit in the yard. He also saw the overflow from the slurry pit (which the Plaintiff had seen a few days earlier), and noticed the wet manure on the ground at the rear of the slurry pit. He returned on the 5th of July but there was no improvement in the pollution. The smell found in the water supply in the Plaintiff's house was, he said, unpleasant - a "really foul smell", which Mr. Brennan positively identified as a smell of silage. He advised that a geologist should be employed.

On the 5th and 20th of November 1980 Mr. Brennan visited the Defendant's lands in the company of Doctor McCarthy, a

geologist whose evidence I will consider later. Again he took photographs which show that at that time there was a very considerable overflow from the slurry pit and a very considerable accumulation of manure on the ground at the rear of the slurry pit. Significantly, Mr. Brennan noticed that although it was then only the beginning of the winter season the slurry pit was almost full. On the 30th of June 1981 he carried out a further inspection and took more photographs and established the difference in levels between the floor of the slurry pit and the bottom of the Plaintiff's well. Conditions had not changed; the channels surrounding the slurry pit were clogged with slurry, and there was a seepage from the channel into the surrounding land. The sleepers in the ope of the slurry pit were buckled (clearly to be seen in the photographs he took) and in danger of collapse and seepage through them could be observed. There was grass in the channels around the pit.

His next visit was on the 25th of February 1982 with Doctor McCarthy and Doctor Dodd, an experienced agricultural engineer. The situation at the slurry pit was now very different.

Work had recently been carried out on it and hard core had been laid at the rear where previously quagmire conditions had existed. All the surface manure had been removed, the channels were free and working and new sleepers had been put in. But the Plaintiff's well was still polluted and for the first time Mr. Brennan decided to have a look at the outwintering unit.

Mr. Brennan produced photographs which he took of this area. It was clear from these and from his evidence and the evidence of Doctor McCarthy and Doctor Dodd that the whole area at the outwintering unit was thickly coated with slurry and manure. The lagoon is unlined and very considerable quantities of slurry and manure would find their way into it. Mr. Brennan's conclusion was that in June of 1980 the overflow from the slurry pit must have been the cause of the pollution of the Plaintiff's well but that the continued pollution in February 1982 had its source in the outwintering unit. He could find no other source which could have been the cause of the contamination from which the Plaintiff suffered.

Dr. Dodd, as I have said, is an engineer. He is on the

staff of University College, Dublin, and has specialised in water pollution control and in the handling and disposal of animal manures. I will return to his evidence later when considering the Defendant's outbuildings and refer now to his evidence about his February 1982 inspection. He saw the Plaintiff's well on the 25th of February. It was then visibly polluted and the well water contained suspended solids. There were then no cattle in the Plaintiff's field or anywhere in the vicinity of the well and there was no evidence of poaching of the ground and no evidence that it had recently been grazed. He visited the slurry pit and the outwintering unit. His opinion was that the lagoon would certainly leach, and that the depth of the top soil in the area was negligible. He saw an aquatic growth in a ditch in a southerly direction from the lagoon which divides the Plaintiff's and the Defendant's land and he thought that this growth could have been caused by septic conditions developing from the surface flow of effluent from the lagoon. He considered that the most probable cause of the pollution in the Plaintiff's well on the day of his visit was the outwintering

unit (there being no overflow at the slurry pit) and he concluded that pollution could not have been caused by the Plaintiff's own cattle.

Evidence (which was not controverted) was given as to the nature of the pollution. Mr. Hickey of Golden Vale co-operative creamery tested samples of water which were taken in July and October 1980 and his conclusion was that the water was contaminated by some matter of faecal origin. More detailed analyses were carried out and other samples taken by Mr. Healy a chemist in the firm of Consultus Limited. An analysis of samples taken on the 4th of July 1980 showed the presence of faecal coliforms and he considered that the water was heavily contaminated with faecal material such as slurry and was not suitable for drinking purposes. Samples taken on the 15th of January 1981 showed that the water was "well outside the limit allowable for potable water and contained large quantities of faecal coliforms". Further analyses of water taken on the 23rd of March 1981, the 15th of December 1981 and the 8th of March 1982 produced the same results

I can summarise, then, my conclusions relating to the

pollution of the well as follows. It commenced in or about the summer of 1978. At the beginning it was associated with heavy rain and usually became noticeable about 36 hours after such rainfall occurred. It was present not only in the summer months when the Plaintiff's cattle were on his land but also during the winter months when they were indoors. In the summer months it was present when there was no poaching in the vicinity of the well or other evidence to suggest that the well could have been contaminated by the Plaintiff's own cattle. In the month of June 1980 the pollution was associated with a distinctive smell of silage. Pollution got worse and became more continuous after Christmas 1981. As the well is polluted by faecal coliforms a form of bacteria derived from the intestines of animals, it is obvious that it is being polluted by animal slurry.

The Defendant's activities

I turn now to the dairy farming business carried on by the Defendant. He started farming the lands in the year 1968 and around about that time he had a herd of between 35 and 40 cows. His practice at that time was to bring his herd into a shed in his farm-yard after Christmas and place the manure from his herd

on a dung heap in the farmyard. Over the years he expanded his herd and modernised his operations. In 1972 he started to develop the outwintering unit to which I have referred and built a concrete slab and dug a ditch and embankment to take the slurry from the feeding area. In the winter of that year he placed silage at the unit for the first time. He also began to build new outbuildings in his farmyard. In December 1973 he built a shed for calving, in 1974 kennels for his cows and in 1975 he concreted an area for the making of silage. In November 1976 he began work on the slurry pit and completed it in January 1977. In 1977 he provided more cubicles, and in 1979 another new shed and a double row of cubicles. As a result his herd is now accommodated in a building which combines a roofed silo with 24 cubicles for adult stock and 32 cubicles for young stock and a second building which combines a roofed silo and 72 cubicles for adult stock. According to Dr. Dodd the capacity of a building would normally be considered to be about 10 per cent more than the number of cubicles. This would mean that the Defendant's buildings would be capable of housing about 105 adult stock and

about 35 young stock.

I have already described the slurry tank. The soiled water tank into which soiled water from the farm buildings and the seepage from the slurry pit should drain has a capacity of only 330 gallons. I accept Dr. Dodd's evidence that the recommended design capacity for a soiled water tank is 35 gallons per animal for dry stock and 50 gallons per cow place. On the basis of the capacity of the accommodation in the Defendant's outbuildings the tank is clearly undersized. Indeed the Defendant does not seriously contest this evidence and I am quite satisfied that although he obtained a grant from the Department in relation to the disposal system he installed, his work was not supervised and the size of the tank was determined by the Defendant himself and is not in accordance with the Department's requirements. In addition to the inadequate soiled water tank I am satisfied that the slurry tank is also inadequate for the number of cattle which can be housed in the Defendant's outbuildings. According to Dr. Dodd it is normal to allow 1.5 square feet per cow per week when designing a dungstead. If the winter period is taken at an

average of 20 weeks this would mean that 30 square feet per cow place would be required in the Defendant's slurry pit. As the pit has a capacity of 3,080 square feet this means that it has provision for about 103 cows only. It follows that if the buildings are used to full capacity the slurry pit would be inadequate for its purpose. Dr. Dodd's opinion is supported by the evidence. Not only was the slurry pit nearly full in November 1980 at the beginning of the winter period but the Defendant accepted that the slurry pit was inadequate for the number of animals he now has. It is obvious the result of an inadequate slurry pit and an undersized spoiled water tank is that overflow conditions are likely to result.

As to the outwintering unit, the evidence shows that it was constructed in the year 1972, that the concrete area was extended in the year 1974, and that extra feeders were put in in 1981. A greatly increased amount of silage was also put in the area in 1981.

Over the years the Defendant has been increasing the size of his herd. The Defendant's records show that at the end of the

year 1972 his closing stock was 99 animals and that at the end of the year 1980 his closing stock was 141 animals. But these figures do not show the size of his stock at other times of the year and evidence from the Defendant's notebook show that his stock was in fact much higher at other times. In an affidavit which he swore in July 1980 he said he then had a 182 herd of cattle and at the present time he now has about 219 animals. Because his herd has increased he has had to take extra land in the vicinity of his own farm. Significantly, his farm records show a considerable increase in silage in 1980, 53 acres as compared to 23 in the previous year.

As his herd increased accommodation in the outbuildings became inadequate and the Defendant has had to increase the use of the outwintering unit. In the early days of his farming activities he used the unit only between November and January. But in the winter of 1980 he used it for a four month period instead of a two month period, and in that year he had about 50 cattle on it. Last winter he placed more silage on the outwintering unit than ever before and he agreed that in recent

years he has doubled the number of cattle on it and has doubled the length of time they spend on it.

It was urged on the Defendant's behalf that the Defendant's farmyard could not possibly be a source of the pollution of the Plaintiff's well because if it was contamination would have manifested itself before 1978 and would certainly have occurred prior to the erection of the slurry pit in the days when manure was collected in an unprotected manure heap in the yard. But the defendant's evidence does not require me to draw such an inference. The Defendant's business has been increasing over the years, and with it the size of his herd. The amount of manure to be disposed of has likewise increased. The disposal system was changed in the winter of 1976/77 and quagmire conditions were created from the overflow of the slurry pit and surrounding channels. These developments could explain why, if the farmyard area is a re-charging zone for the Plaintiff's spring, no pollution occurred prior to 1978. Similarly, I cannot draw any inference in the Defendant's favour arising from the fact that the outwintering unit had been used since about the year 1972,^{as} quite clearly its use has been significantly increased,
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over the years, particularly since 1980.

On the other hand, certain conclusions can be drawn from the evidence, which I have up to now been considering, which strongly suggest that the Defendant is responsible for what has happened to the Plaintiff's well. The well has since 1978 been polluted by animal slurry. This pollution did not occur as a result of the overflow of the river Loobagh. It was not caused by the Plaintiffs own cattle. In 1978 a slurry disposal system was introduced by the Defendant which was inadequate for the increasing numbers of cattle in his herd and which overflowed causing slurry to accumulate in quagmire conditions behind the slurry tank. In addition the use of the outwintering unit has been greatly increased since 1980 and massive quantities of slurry are stored in an unlined lagoon beside it. Furthermore, in 1980 the Plaintiff's well was polluted by silage at a time when no silage had been cut by him or his neighbours and at a time when the defendant had cut a greatly increased quantity of silage, the juices from which would have been washed into the choked channels around the slurry pit and have found their

way into the overflow seen by the Plaintiff and Mr. Brennan. No adequate steps to stop the overflow at the slurry tank were taken until after a committal motion was served on the Defendant.

All the facts in the case support the Plaintiff's claim. In their light I now turn to the geological evidence which was given on the parties' behalf.

The Geological evidence.

Dr. McCarthy, called on the Plaintiff's behalf, is a highly qualified geologist presently on the staff of University College Cork. For the purpose of preparing his report and giving evidence he obtained aerial photographs of the area and he personally carried out a visual examination from an altitude of 500 feet above Knocksouna Hill. He traversed the area on foot and examined the rock outcrops taking photographs of various geological features. In addition he consulted the maps of the area in the geological survey of Ireland and searched the geological literature about the area. He visited it on the 15th and 21st of November 1980 and again on the 25th of February 1982. His evidence was to the following effect.

As to the geographical setting and surface drainage, he found that the Defendant's farmyard lies on the northern flank of

the river Loobagh which is draining, broadly speaking, in a westerly direction. The river is of a high sinuosity type and it continually reworks its own alluvial deposits. The trend of the deposits and of the river channel is the southwesterly detour which the river takes and which, in Dr. McCarthy's view, indicates the control of the river channel course by shallow bedrock extending southwards and southeastwards below the surface of Knocksouna Hill. In his opinion this fact strongly indicates that the cover of the superficial deposits capping the bedrock over the rising land to the north and northwest of the alluvial valley is thin. The Plaintiff's well is located to the southeast of the area close to the river at an altitude of approximately 205 feet O.D. and about 533 yards from the Defendant's slurry pit overflow which is at an altitude of about 250 feet O.D. There are no intervening valleys between the slurry pit and the well and the land surface rises progressively in a straight line from the well to the pit. Knocksouna Hill is a prominent feature of 338^{ft} O.D. and lies to the north of the line between the slurry pit and the well. There is an abundance of rock outcrop on the hill area and along its southwestern flank.

There are a series of springs located near the river. To the south of the slurry pit these were numbered on Figure 8 which the witness produced as S2 to S8. They have a temperature significantly higher than the water in the Plaintiff's well and this indicates that they are not supplied from water in the immediate area, that they were in contact with the bed-rock and were part of a hot spring system unconnected with the Plaintiff's well.

Dr. McCarthy prepared a detailed map of the outcrop pattern (Figure 2) which showed the location of the surface rock exposures. The bed-rock (where rock was not visible on the surface) is overlain by a cover of superficial deposits. This drift cover is thin or absent at and around Knocksouna Hill and at and around the Defendant's farmyard and slurry pit. The drift thickens southwards and southeastwards towards the river and is accompanied by an increase in the depth to the bed-rock surface. The superficial deposits comprise (a) a thin organic soil cover and (b) a wedge of glacial deposits which are banked against

the rising ground which descend below the alluvial deposits in the lower alluvial plane area and (c) alluvial sands and gravels in the alluvial plane.

Dr. McCarthy was quite definite that the bedrock geology is composed of compact, well stratified, carboniferous bioclastic limestones and that a characteristic feature of the limestone is the excellent development of bedding throughout the area which, he claimed, rendered a preferred grain to the rock. Typically, he thought, the bedding planes are separated by an average of 20 cm. This part of his evidence was subject to considerable controversy and I will return to it later. He considered that the limestones were composed almost entirely of calcium carbonate with minor dolomict and siliceous levels.

He explained that the limestones were originally laid down in the form of horizontal sheets or beds and that subsequently these horizontal beds were subjected to powerful horizontal north-south compressive stresses resulting in the development

of east-west trending folds. The folds in the area of Knocksouna Hill were what is termed synclines, that is basin-shaped troughs or inverted arches. The axis of the syncline is orientated approximately east north-east/south south-west. It plunges gently to the south/south-east. The beds to the north of the axis of the syncline, that is to say on the side of the axis nearest of the Defendant's farm, are inclined downwards at angles up to 54 degrees to the horizontal whilst in its axial zone the beds are inclined at less than ten degrees to the east north-east, that is parallel to the axis of the syncline. Beds to the south of the synclinal axis are inclined towards the north. The result is that beds which underline the Defendant's farmyard and the outwintering unit descend below the ground and are brought back to the surface on the southeastern flank of the syncline in the vicinity of the Plaintiff's well - a phenomenon which he illustrated in the Figures produced at the hearing.

The compressive forces which formed the folds also caused the development of a number of fractures in the rock - "joint"

fractures (i.e. closely spaced planar, clean fractures) as well as "fracture cleavage" (i.e. fractures which form a number of irregular features).

The limestone at and around Knocksouna Hill had developed a significant degree of porosity due to weathering and dissolution. In Doctor McCarthy's opinion by far the most significant and quantitatively important were solution cavities which had developed along the bedding plane. However, in addition solution had also taken place along the joint fractures. These are of different types. In Doctor McCarthy's opinion the north-south striking joints provide vertical pathways for water to reach lower levels within the bedrock so that it can travel laterally between the sub-surface bedding planes and along the east-west striking joints which are more gently inclined.

To reach conclusions about the ground water flow from the Defendant's slurry pit Doctor McCarthy considered the evidence of the overflow which he saw on his first series

of visits in November/December 1980. This overflow was contained in a limited area and formed a quagmire. The ground beyond the quagmire was free of slurry and he concluded that there was considerable soakage from this quagmire into the underlying rock. The question which had to be determined was how the ground water would migrate from this area.

Doctor McCarthy pointed out that rain water, polluted with the slurry in the overflow area, which entered the ground water system would be controlled by (a) gravity and (b) the fracture pattern which he described. He concluded that the ground water flow would be controlled by the bedding and by the joint and cleavage solution cavities but that the most important of these were the bedding cavities. The bedding cavities were so inclined that the ground water below the slurry pit would migrate downhill along the bedding cavities in an easterly direction towards the Plaintiff's well. This migration would be facilitated by the north/south "dipping" joints (i.e. the joints which are parallel to the dip of the beds) and by the east/west joint fractures which are parallel to axis of the syncline. The fractures were such that

pollutants in the ground water could be carried down to a succession of lower bedding planes and towards the Plaintiff's well. The fractured bed rock, in Doctor McCarthy's opinion, formed an aquifer which fed the Plaintiff's well.

Doctor McCarthy pointed out (and on this there is no controversy) that the Plaintiff's well is in fact a spring, that is to say a point at which the ground water is escaping to the surface under pressure. The spring is a permanent one and does not dry out even during dry conditions. For a number of reasons he considered that the ground water flowing from the well did not come up-stream that is to say from the east, and he concluded that the source of the ground water from the well was from the northwest. Because of the fracture trend to which he had referred he considered that it could be concluded that part of the recharge zone to the Plaintiff's well must lie at and around the Defendant's slurry pit overflow. As a result pollutants soaking into the rock fractures at and below the overflow of the slurry pit would be incorporated into the ground water system and would be transported to the well.

When Doctor McCarthy returned to the lands on the 25th of February 1982 the situation had considerably changed. As I have already pointed out, there was then no overflow at the slurry pit and so pollutants were not then entering the ground water system from that source. Doctor McCarthy, however, examined the outwintering unit and saw the large accumulation of slurry in the area and in the lagoon. He considered that the continued pollution of the Plaintiff's well was due to slurry entering the ground water system from this point. The bedrock was exposed in the area and he considered that the slurry could circulate into the fractured bedrock without difficulty. Whilst some would flow on the surface of the ground towards the river part of the slurry would go through the ground water system he had described in an easterly direction towards the well.

The challenge to Doctor McCarthy's conclusions which I will now examine was given in the evidence of Mr. Connor and Mr. Cullen two consultant hydrogeologists called on the Defendant's behalf.

Mr. Connor was first consulted in the autumn of 1980 and visited the area on the 2nd of October 1980 and carried out what he described later in an Affidavit as an "extensive survey

of the Defendant's land." He prepared a report arising from this survey and on the 17th of December 1980 again visited the area and took samples of the water and soil from the Plaintiff's well and the ground surrounding it and caused a bacteriological examination to be carried out on the samples he had taken.

After the October survey Mr. Connor reached a conclusion similar to that of Doctor McCarthy as to the solid geology of the area. He then concluded that the "underlying consolidated rocks are limestone of carboniferous age. The bedding dips are towards the southeast and there also well marked vertical joint systems, with a north-south trend. The limestones are thick bedded bioclastic limestones." But he reached a different conclusion about the ground water system. He pointed out that on the southern side of Knocksouna Hill the surface flow would be in a southward direction towards the river Loobagh and he concluded that the ground water flow direction would be in the same direction as the surface water flow which would mean that it would not be in the direction of the Plaintiff's well. To support this conclusion he prepared a map (map 80/W/30) which

showed the watertable contours in the area and which also established he claimed that the ground water flow was towards the Loobagh river and not eastwards towards the Plaintiff's well. The view was expressed in his first report that it would be "completely impossible" for waste water overflowing from the Defendant's yard to pollute the Plaintiff's well, and that as pollution occurred after heavy rainfall it was probably local pollution coming from within a few yards of the Plaintiff's well and he pointed out that this type of pollution was "not uncommon in farm wells where proper sanitation methods are not enforced in the immediate vicinity of the well." He took samples of the Plaintiff's well water and a sample of the soil from beside the well. Both these samples contained faecal coliforms and Mr. Connor then expressed the view that he could with every confidence state that the source of the pollution of Mr. Berkery's well was the sub-soil surrounding the well and not the Defendant's waste water reservoir.

By December, 1980, therefore, Mr. Connor had come to the conclusion that the source of pollution was the soil

surrounding the Plaintiff's well resulting, he considered, from the Plaintiff permitting his cattle to be in close proximity to it. Whilst undoubtedly the soil was polluted the conclusion which Mr. Connor drew from this fact did not necessarily follow. The pump in the pump-house adjacent to the well had been leaking and the leaking water soaked into the ground at the very point at which the sample was taken, by Mr. Connor. Thus the water from the well polluted the soil (and not vice versa) and evidence of this polluted soil does not establish one way or the other how the well was polluted.

This witness again visited the area on the 1st February, 1982 and the 1st March, 1982. As a result of these visits he prepared a further contour map of the area for the purpose of ascertaining the direction of the ground water flow. The elevations of the water-table were measured at twenty three locations and water-table contours were then constructed. The map (number 82/W/8) shows these contours and also what is claimed as the direction of the ground water flow which are shown on the map at right angles to the contours. This exercise confirmed Mr. Connor in the view he had previously held. The flow lines

on the map showed that the ground water from the Defendant's farm yard would flow in the direction of the Loobagh Rive (i.e. in a southerly direction) and not towards the Plaintiff's well (i.e. in an easterly direction) and Mr. Connor expressed the opinion that Doctor McCarthy's statement as to the source of pollution (which he had read before writing this third report) "contravenes the basic concepts of hydrogeology and physics".

Mr. Cullen was the second expert witness called on this aspect of the case on the Defendant's behalf. He expressed the view that he would expect the ground water to flow in the direction shown on Mr. Connor's maps and he supported Mr. Connor's conclusions on this aspect of the case. But his main contribution to the debate was on an entirely different point. He challenged Doctor McCarthy's view that the area comprised bedded limestone and stated that Knocksouna Hill was a reef knoll. If this was so then the bedding planes described by Doctor McCarthy would not exist and the ground water could not migrate in the manner he suggested.

I think it is important to see exactly how this

controversy developed. Doctor McCarthy's report (which, as I have said, was available to Mr. Connor several months prior to the hearing and on which he commented in his third report) expressed the opinion that the bed-rock geology in the area was well stratified limestones and that there was excellent development of bedding in the area. When Mr. Connor wrote his first report in October 1980 he stated that the underlined consolidated rocks were limestones and that they were thickly bedded. When commenting on Doctor McCarthy's report in an Affidavit sworn on the 19th November, 1981, Mr. Connor made no suggestion that Knocksouna Hill was a limestone reef or that the area was not one of bedded limestone. He suggested that there was no sufficient evidence to justify that the bedding occurred as shown by Doctor McCarthy in the figures annexed to his report but he did not suggest that bedding did not exist or that the hill was in fact a limestone reef. The first time that Mr. Connor considered this possibility was when Mr. Cullen was instructed in the case on Wednesday the 5th May, the second day of the hearing and at a time when Doctor McCarthy was giving evidence. In a conversation between Mr. Cullen and Mr. Connor Mr. Cullen suggested to Mr.

Connor that Knocksouna Hill might be a reef knoll. On Friday the 7th May Counsel for the defence very properly requested that Doctor McCarthy be recalled for further cross-examination. This occurred and it was put to him that in fact Knocksouna Hill was reef limestone. He denied this and gave detailed reasons why this was not so. But it is important to note that on Friday the 7th May no detailed examination of the area had been carried out by Mr. Cullen. He had visited it briefly in the evening of Wednesday the 5th and did not carry out a detailed examination until Saturday the 8th. So, the suggestion relating to the solid geology of the area was put to the Plaintiff's witness prior to any examination which would establish that the suggestion was a valid one. On Saturday the 8th of May Mr. Cullen examined the area and took samples of rock from different parts. On the afternoon of the 10th May Doctor McCarthy was again recalled at the request of the Defendant's Counsel and again questioned on this point. But it is most significant that the samples of rock which Mr. Cullen had taken and which he claimed established that the rock was reef limestone were not shown to the witness. They were produced for the first time by Mr. Cullen when he gave

evidence on the following Thursday. On the previous day Mr. Connor gave his evidence in the course of which he altered the opinion which he had previously held that the area comprised bedded limestone. He had visited the area again the day before and it would appear that it was as a result of this visit and his conversation with Mr. Cullen that his conclusions on this important aspect of the case were changed.

Mr. Cullen stated that he realised when he was walking up Knocksouna Hill that he was in a reef environment and that the first impression he had was that the hill may be a reef knoll. He explained that the existence of bedding in a reef environment was suspect and he eventually came to the conclusion that Doctor McCarthy was wrong in concluding that the area was one of bedded limestone. He concluded that the hill was in fact a reef and that the beds were what he termed "top-of-reef" beds. He stated that he had found reef conditions in the area, particularly to the north of the hill and on either side of the laneway to the Defendant's house. He took samples of the rock which he said confirmed his opinion that the rock was reef limestone. As I have said, Mr. Cullen's conclusions were supported by Mr. Connor

who gave evidence the day previously. He accepted that there were exposed bedded limestones on the hill but in his view these were beds overlaying the reef and that he had seen odd crops of reef limestone in the vicinity of the Defendant's farmyard which he had not observed on previous visits. He stressed that there was no conclusive evidence of the existence of the syncline claimed by Doctor McCarthy to exist in the area and that the existence of the reef made it quite impossible for the bedding to occur in the way suggested by Dr. McCarthy.

I prefer, for reasons which I will develop more fully in a moment, Doctor McCarthy's opinion and conclusions to those of Mr. Connor and Mr. Cullen. As to the conclusions based on the water-table gradients, Dr. McCarthy pointed out that it would be correct to draw the flow lines of the ground water as shown on Mr. Connor's map at right angles to the contour lines if the underlying rock was isotropic. This, however, is not the case and accordingly it is not correct to assume the ground water follows the flow lines demonstrated in Mr. Connor's maps. Furthermore, Dr. McCarthy pointed out that the flow line shown on map no. 82/W/9 travelling southwards from A and turning westwards

below the two hundred foot contour line is not accurate as the hot spring system is a different system to that on Knocksouna Hill. And there is a manifest error in map no. 80/W/30 in that the contour line is shown to progress to a non-existent well and in addition the levels shown on the map are not accurate. Most significantly, the Defendant's contour theory makes no allowance for the control on the ground water which the abundant fractures in the bedding plane of the limestone would exercise. As to the nature of the bedrock I accept Dr. McCarthy's view that the bed-rock in the area forms an aquifer with a preferred pattern of fractures and that these are the most significant influence on the flow of the ground water system. I accept his conclusion that the area is, in fact, one of bedded limestone and that he had sufficient evidence from the considerable amount of outcropping in the area to establish the orientation and angles of the beds and the existence of a syncline which plunges in the direction shown on his figures. It follows from my acceptance of his evidence as a whole that I also resolve the other, less important, points of controversy

in the Plaintiff's favour. The idea was canvassed that there might be a fault in the area which would interrupt the flow of the ground water to the Plaintiff's well but I accept that it is quite proper in the present case to assume that no fault is present. I accept that polluted water could travel through the alluvial deposit in the vicinity of the Plaintiff's well and contaminate it with particles of solid matter and that the rate of flow from both the farmyard and the outwintering unit would not be as suggested by Mr. Cullen from the calculations he made from a sample of alluvial deposit. I do not think that it is necessary to make three bore holes (at a cost of something in the region of £10,000) in the vicinity of the Plaintiff's well in order to reach valid conclusions as to the probable source of its pollution. As I have said, there is an abundance of evidence from which an experienced geologist can reach conclusions which on the balance of probabilities establishes the existence of bedding planes of an angle and orientation and with a fracture pattern described by Dr. McCarthy which would be the dominant influence on the ground water system in the area.

I should explain now in a little detail, why I have

accepted Dr. McCarthy's opinion and conclusion.

Firstly, his conclusions give a reasonable explanation for a phenomenon which would otherwise be inexplicable.

From the year 1978 the Plaintiff's well has been polluted. There is uncontradicted evidence that since 1980 faecal coliforms have contaminated the well and it can be assumed that this was the cause of the earlier pollution. From whence did they come? From the Plaintiff's own cattle?

I am satisfied that this is not so. The Plaintiff was a patently honest witness and gave his evidence with care and precision. I accept that he used the field in the way he described and Mr. Brennan's and Doctor Dodd's evidence supports his testimony which establishes that his cattle did not pollute the well. If they did not, could, then, the pollution be from the river Loobagh? Again the evidence shows that this could not occur. And what about some inherent quality in the soil surrounding the well? Again, this theory which was but tentatively advanced by Mr. Cullen cannot be supported by the facts of the case. Dr.

McCarthy's conclusions that pollutants from the over-flow at the slurry tank and from the area of the outwintering unit enter a ground water system which flows to the Plaintiff's well is the only rational explanation for what has happened to the Plaintiff's well.

Secondly, his conclusions find support from the evidence. In June, 1980 both the Plaintiff and Mr. Brennan noticed a distinctive smell of silage in the water from the well. The Defendant had cut silage on the 22nd May and placed it in his out-buildings. The channels around the slurry tank were at that time blocked and quagmire conditions at the rear of the tank were seen in the month of June both by the Plaintiff and Mr. Brennan. Neither the Plaintiff nor any of his neighbours had made silage at that time and the only way that silage could contaminate the Plaintiff's well was through the ground water system as described by Dr. McCarthy. Furthermore, his evidence that seepage from the lagoon at the outwintering unit would enter the same ground water system gets support from the

facts established by the evidence. In February, 1982 the Plaintiff's well was still contaminated even though no overflow was then occurring at the slurry pit. Massive accumulations of effluent existed, however, at the out-wintering unit which obviously seeped into the ground water system. There had been no cattle on the Plaintiff's land for some months prior to this date and yet the well was heavily polluted. These facts suggest that the ground water system flows as Dr. McCarthy has described.

Thirdly, I was impressed not only by Doctor McCarthy's qualifications and considerable experience but also by the detached manner in which he gave his evidence. On the other hand, it seemed to me that the Defendant's witnesses on this aspect of the case strayed from time to time from the role of objective scientist into that of enthusiastic advocate. Furthermore, in the circumstances of this case, I found unconvincing an intellectual position which denied the validity of an explanation for

the pollution of the Plaintiff's well but declined to provide any plausible alternative. I must also state that I was influenced (but not, I hasten to add, decisively influenced) by the fact that no explanation was forthcoming as to why Mr. Cullen did not produce for comment by Dr. McCarthy when he was giving evidence on the 10th May, the rock samples which Mr. Cullen had obtained on the 8th May and which he said established the existence of reef limestone. The absence of explanation suggests that the failure to give Dr. McCarthy such an opportunity was not due to inadvertence.

Conclusion.

I am satisfied that the contamination of the Plaintiff's well is caused by pollutants coming from the overflow at the Defendant's slurry pit and/or from the outwintering unit on the Defendant's land. I do not think that it is necessary for me to consider the submission made on the Plaintiff's behalf that the rule in Ryland . v. Fletcher applies in this case as the Defendant's Counsel has accepted

that if I find that the Plaintiff's well has been polluted from the Defendant's land then the Defendant is liable in nuisance to the Plaintiff. The parties have agreed that the Plaintiff has suffered special damage in the sum of £4,000 as a result of the pollution in his well and I award this sum to him. In additon he is entitled to a sum which I measure at £500 for general damages arising from the inconvenience he has suffered. This sum of £4,500 should be payable forthwith. By agreement with Counsel I have left over the question of whether or not an injunction should be granted and the form it should take, if it is to be granted. I will hear Counsels submissions on this point.

A motion for committal arising from the breach of the interlocutory order was brought against the Defendant and by consent was heard at the same time as this action. It was, in my judgment, properly brought as the nuisance was not abated and no effective steps to remedy the overflow conditions at the slurry pit were taken until after it was issued. But as a final order will now be made it is

unnecessary to make any order on the motion other than one
in relation to costs.

Approved

Daniel L. Litch

5th July 82