

PREVENTION OF POLLUTION

1. QUALITY OF WATER

During the year 607 samples of river water, mostly taken on routine surveys, were analysed in the laboratory. The results are tabulated on pages 55 to 60.

River Welland—Non-tidal

The two full chemical surveys of the non-tidal River Welland indicate that the river is in general of acceptable quality.

At the time of the first survey grass silage liquor was found to be discharging to the River Jordan which flows into the Welland upstream of the second sampling station. The higher permanganate value and B.O.D. at this station, and at the Welham and Ashley stations, were probably due to this isolated discharge.

The only polluting discharges of significant volume made to the non-tidal Welland are the treated sewage effluents from Market Harborough, Stamford, and the Deepings. The discharges are at some distance apart, and natural recovery takes place before there is any cumulative effect. Effluent from the Deepings enters the relatively slow-flowing Welland between Uffington and Spalding. This stretch of the river produces algae in the summer months, and an apparently high B.O.D. is exerted. Dissolved oxygen concentrations are correspondingly high, and the effect of the Deepings discharge is hardly noticeable. Algal activity appears to decline between Deeping and Spalding, which may be due to the elimination of nutrient material entering at Stamford and Deeping St. James. At times of lower temperature and during shorter daylight hours the algal activity is less marked, and the B.O.D. becomes a more accurate indicator of quality.

Eye Brook

Samples taken in conjunction with Welland surveys were satisfactory.

River Chater

Samples were of good quality.

River Gwash

The upper reaches hold a good head of coarse fish, and the lower reaches are maintained as a successful trout fishery. The headwaters are polluted by sewage effluent, but with the exception of that from Oakham the discharges are relatively small in volume.

As it was possible to carry out only one chemical survey of this tributary, no definite assessment can be made, but it does appear that although the North Gwash is slightly polluted the river recovers fairly rapidly and the last ten miles or so are very satisfactory.

Ram Dyke and Brook Drain

These watercourses originate near Helpston, and discharge to the Welland via the Maxey Relief Channel. In dry weather there is no flow upstream of Helpston Paper Mill, and although subsidiary drains enter downstream, the discharge to the Maxey Channel was highly polluted.

The installation of a new trade effluent plant at the paper mill has already resulted in some improvement, and it is hoped that this will be continued as the plant is extended.

Bourne Eau

There is normally little natural flow in this fen drain which receives two substantial polluting discharges fairly close to its source downstream of Bourne, resulting in very unsatisfactory chemical conditions throughout its length. Deposited suspended matter, particularly downstream of the Bourne sewage effluent outfall creates a thick bed of organic sludge. Summer conditions encourage a massive growth of flagellate algae, and at the time of one survey the Eau at Tongue End had the appearance of pea soup, and contained dissolved oxygen to 470 per cent of the saturation value.

River Glen

The headwaters of the two tributaries suffer pollution from a number of villages which have inadequate facilities for sewage treatment. The local authorities are aware of the unsatisfactory position, and a number of village schemes are in preparation.

Downstream of the confluence of the East Glen and the West Glen the water is affected more by natural causes such as algal growths than by sewage or trade effluents.

River Welland—Tidal

The river immediately downstream of the tidal sluices at Spalding is grossly polluted by the discharge of settled sewage from Spalding and by grossly polluting effluent from the Gas Works, a fruit and vegetable cannery, and a beet sugar factory. Fortunately the latter discharge, the largest in volume, is not made during the summer, but the other discharges cause gross pollution at Fosdyke, particularly at low tide during hot weather.

River Nene—Non-tidal

Six full chemical surveys of the non-tidal River Nene were made at bi-monthly intervals, and additional fortnightly surveys were carried out from Billing Bridge to Thrapston between April and October.

Comparison of the six full surveys with those of the two previous years is as follows:

Classification	1963-4		1964-5		1965-6	
	No. of samples	Per cent	No. of samples	Per cent	No. of samples	Per cent
Satisfactory ..	79	69	59	44	63	58.5
Unsatisfactory ..	35	31	74	46	45	41.5

A sample is regarded as "satisfactory" if the 5-day Biochemical Oxygen Demand does not exceed 5.0 milligrams per litre.

Two major factors contributed to the increased number of satisfactory samples. The higher rate of flow in the river has afforded greater dilution for the sewage effluent, and the improvement at the Northampton Borough Sewage Disposal Works produced an effluent in the winter months far better than that of previous winters. Pollution from the Northampton discharges was less far-reaching in the last quarter of the year.

Results obtained over the past two years on three sections are as follows:

	Source to Billing		White Mills to Ringstead		Oundle to Dog-in-a-Doublet Sluice	
	No. of samples taken	% satisfactory	No. of samples taken	% satisfactory	No. of samples taken	% satisfactory
1964-5 ..	42	88	56	14.5	35	40
1965-6 ..	36	94.5	42	19	30	70

Expansion of Northampton will ultimately double the daily volume of sewage effluent, and only a very high quality will enable the river to contain the additional polluting load.

The Irthlingborough to Ringstead length remained unsatisfactory, largely because of a number of poor or grossly polluting discharges of sewage and trade effluent before the river can recover from the effect of the Northampton effluent. It had been hoped that the planning stage of the proposed Regional Scheme for Wellingborough would be well advanced, but the discussions between the several authorities do not appear to have proceeded with that sense of urgency or with the will to reach agreement which had been hoped for. Until such a scheme has been completed it is unlikely that there will be any improvement in this length of the River Nene.

River Ise

Flows in the river where the survey was made were higher than in the previous year, which probably accounts for the apparent improvement.

No major polluting discharges are made to the Ise upstream of Kettering, although there is a deterioration in times of low flow, but the quality downstream of Kettering still leaves much to be desired. The delay in completing the scheme to remove the grossly polluting discharge of sewage effluent from Finedon has delayed the improvement downstream of Kettering which was expected towards the end of the year.

A biological survey was carried out in May with sampling stations at Barford Bridge, Geddington, Warkton, Finedon Station and Harrowden Road. Caddis (Trichoptera) and Mayfly (Ephemeroptera) nymphs were found to be fairly abundant at the three higher stations, in very small numbers at the fourth station, and at Harrowden Road caddis had almost disappeared and mayfly were in very small numbers.

Willow Brook

Chemical surveys in the autumn and winter confirmed that the Willow Brook for the upper ten miles is very unsatisfactory. In winter self-purification is negligible, and the whole river shows substantial pollution.

The relatively high free and saline ammonia content of the trade effluent discharge from Corby Steel Works continues to cause great concern. Fortunately high pH values (greater than 8.0) are rarely observed, and the river maintains a good head of coarse fish throughout the length downstream of Deene Lake. The privately stocked trout fishery between Apethorpe and Fotheringhay continues to indicate a satisfactory river.

A biological survey carried out in May at the seven sampling points from Deene Lake downstream to Fotheringhay showed that the variety and abundance of aquatic fauna increased downstream. It would appear that the Brook from Deene to Kingscliffe may be regarded as 'fair' and from Kingscliffe to Fotheringhay as 'good'. Of the two indicator organisms, freshwater shrimp (*Gammarus pulex*) and Mayfly nymphs (Ephemeroptera), the former were rare in the upstream section, but abundant in the downstream section, the latter first made an appearance in very small numbers at Kingscliffe and were relatively abundant at all points downstream.

Harpers Brook

Chemical surveys carried out in the autumn and winter showed the stream to be fairly clean generally. The only significant polluting discharge is the sewage effluent from Brigstock, and at the time the surveys were made it appeared to have no significant effect, although the discharge may have been responsible for the low dissolved oxygen at Lowick in the autumn survey.

South Holland Main Drain

This major fen drain varies but little from year to year, and it receives no polluting discharges of any consequence. High B.O.D. values are invariably associated with algal growths, and a generally high dissolved oxygen content is maintained along the length of the drain.

River Nene—Tidal

Six surveys were carried out, and the slight improvement on the previous year, particularly at Sutton Bridge, cannot be accounted for by any reduction in polluting discharges, and is more likely to be a result of the generally higher flow of fresh water entering the tidal section at the Dog-in-a-Doublet Sluices.

Particulars of the sampling stations, with the average maxima and minima values, are contained on pages 55 to 60.

2. STANDARDS APPLIED TO EFFLUENTS

The Royal Commission's recommendations are usually adopted for fully treated discharges of sewage and trade effluent, but more stringent standards are being increasingly applied where circumstances warrant. The proposal to make a major abstraction at Elton for an impounding reservoir in Rutland emphasises the importance of raising the standards to improve the quality of the river.

3. SAMPLES AND ANALYSES OF EFFLUENTS

During the year 677 samples of effluent were analysed, 570 of which were from sewerage and sewage disposal works and the remainder from trade premises. Miscellaneous analyses numbered 127, many of these being samples of sewage or trade waste at various stages of treatment. Of the sewage effluents analysed, 51 per cent were unsatisfactory. Of the 107 trade effluents analysed, 80 per cent were unsatisfactory.

Classification of discharges of sewage and trade effluents during the year is as follows:

	Number	Per cent
Sewage Works generally producing satisfactory effluents	105	49
Sewage Works generally producing unsatisfactory effluents	111	51
Trade premises generally discharging satisfactory effluents	6	22
Trade premises generally discharging unsatisfactory effluents	21	78

In addition to the analyses carried out in the laboratory two Statutory Samples of sewage effluent were submitted to a Public Analyst for determination of non-ionic synthetic detergents.

4. SEWAGE AND TRADE EFFLUENTS

A considerable amount of work was found to be necessary in recording the various discharges, and carrying out exploratory surveys in the Welland catchment.

Sixty-four applications under the Pollution Prevention and Water Resources Acts have been dealt with, of which all but one have been approved subject to appropriate conditions. The discharges can be broken down as follows:

	Approved	Refused
Sewage effluents	24	
Storm sewage overflow discharges	4	
Emergency overflow discharges	2	
Surface water discharges	12	
Trade effluents	6	
Discharges to underground strata	15	
Sewage effluent to limestone strata	1	

In granting section 7 consents in respect of fully treated discharges of trade and sewage effluent, volume and quality control conditions have been prescribed. In consents for storm sewage overflows, a condition has been prescribed to the effect that the discharge should be of such a nature and composition as could be produced by the plant as approved and when properly operated and maintained.

Usually sewage effluents are required to comply with the Royal Commission recommendations (not contain more than 30 milligrams per litre of suspended solids nor take up more than 20 milligrams per litre of dissolved oxygen in 5 days). In five cases where an effluent of such a standard would have caused some deterioration in the quality of the stream more stringent conditions for solids and B.O.D. were applied.

Conditions relating to trade effluents were similar to those for sewage effluents, but included a temperature condition and (where necessary) conditions as to toxic constituents. In the case of crude sewage discharges from emergency overflows of pumping stations, the standard condition is that the discharge shall only be permitted at times of mechanical or electrical breakdown, or failure of the pumping plant. In granting consent for surface water discharges a condition is imposed requiring the discharge to be one of surface water only, uncontaminated by domestic sewage or trade effluent.

It has not been necessary to take any prosecutions under section 7, and no appeals have been made to the Ministry against the prescribed conditions.

It must be remembered that conditions prescribed under section 7 are sanctioned by criminal proceedings, and it is essential that the conditions should be precise and unambiguous if they are to be enforced in a court of law. The section has undoubtedly enabled much progress to be made in prescribing a standard of discharge acceptable to a River Authority and laying down a minimum to which the sewage authorities or industrialists must work. It is relatively easy to prescribe conditions for a fully treated effluent in dry weather conditions, although it may be much more difficult to define and prove "dry weather" in a court. It is also very difficult to control the exceptional but inevitable discharges of storm sewage effluent, and it is those discharges which are more likely to result from the negligent and culpable operation and maintenance of a sewage plant. Storm water discharges have to be accepted, but the circumstances in which they are made and the degree of pollution caused must depend very much on the operation and servicing of the storm water tanks. Fortunately the conditions prescribed under section 7 serve the purpose as most Authorities have not had to test them in a court of law.

There have been several silage pollutions, but the farmers responsible have been advised as to preventative measures. Oil pollutions have again been the greatest cause of concern, and investigations have usually shown that the incidents were either due to accident or ignorance. Whenever appropriate, advice has been given as to preventative and precautionary measures.

Bourne Urban District

Improvements estimated to cost £40,000 are in hand at Bourne sewage works.

Brixworth Rural District

A sewerage and sewage disposal scheme in preparation for Arthingworth and Kelmarsh should remedy an unsatisfactory discharge to the River Ise from the Arthingworth sewage disposal works.

Burton Latimer Urban District

A grossly polluting discharge of trade waste to the River Ise at Burton Latimer through a surface water outlet was removed.

Corby Urban District

Corby sewage disposal works continued to produce a satisfactory effluent. In November a large discharge of ferric chloride caused the crude sewage to be bright orange and reduced the pH value to 3. Fortunately it was possible to divert the sewage to the storm tanks, where it was treated with lime before being gradually pumped back through the works.

Towards the end of December difficulty was caused by flooding of the 1956 section of the works, and it was necessary to divert some of the effluent to the old outfall. The prescribed consent has been amended to allow flows over 2.05 million gallons per day to be discharged to the stream via the original outfall, which has overcome the difficulty of passing effluent to land irrigation in times of high flow.

Daventry Municipal Borough

Following a heavy fish destruction in the British Waterways Welton Road feeder reservoir (referred to in the Nene River Board's final report) particular attention was given to water levels.

In hot dry weather substantial abstractions to feed the Grand Union Canal are necessary, and Daventry Corporation were requested to construct additional temporary sewage disposal plant with the utmost urgency. Although a temporary extension was to have been brought into use by September, work had not been completed at the end of the year.

Daventry Rural District

Work was recommenced on the partly constructed Everdon sewage disposal works after a long delay caused by the original Contractor being unable to complete the work.

Desborough Urban District

In early January, Desborough sewage disposal works caused pollution when humus liquor being recirculated overflowed at the storm tanks when the decanting valves had been left open. The Council were warned that a very serious view would be taken of any repetition of this negligence.

The Council are investigating means of reducing the large amount of infiltration water entering the foul sewerage system.

East Elloe Rural District

Considerable localised pollution results from the very many small sewage disposal plants in this district. The unsatisfactory position at Long Sutton and Sutton Bridge can only be remedied by the implementation of the sewerage and sewage disposal scheme proposed for this area, which will make it possible to close several small and inadequate sewage disposal plants.

The proposed sewerage and sewage disposal scheme for Holbeach is essential if the water-courses in that locality are to be improved.

Some dyke pollution was caused by slaughterhouse waste at Gedney Hill, but irrigation of settled waste over a large area of grassland has proved a remedy.

Higham Ferrers Municipal Borough

The effluent from Higham Ferrers sewage works has been continuously unsatisfactory since the works were brought into operation in 1955 and the Council decided to supplement treatment of the final effluent by lagooning. Loan sanction for the scheme was refused in October by the Minister of Housing and Local Government, but the Council were supported in their representations and permission to proceed was granted in December.

Irthlingborough Urban District

A length of sewer has been descaled to remedy the premature operation of a storm sewage overflow.

Market Harborough Urban District

Although two new filters were brought into operation early in the year, pollution of the Welland below Market Harborough was caused by an unsatisfactory sewage effluent from the town's sewage works. At the time half the incoming sewage was receiving normal treatment, and the remainder was receiving primary settlement followed by land irrigation. It was suggested to the Council that the total flow of sewage should be passed through the treatment units and the final effluent then irrigated over grassland. The results have proved very satisfactory. The Council were supported in their successful request to the Minister of Housing and Local Government for permission to increase the capacity of the humus tanks.

The Council were advised that they should not extend a refuse tip near to the No. 1 land irrigation area, as that land had produced the least satisfactory effluent, which was thought to be attributable to seepage from the tip. Further investigation showed that some infiltration from a polluted pond which had formed near the tip was responsible for the lower quality effluent from No. 1 land area, and preventative measures were taken.

A sample of surface water discharged to the River Welland at Welland Park, Market Harborough, was very acid, and obviously contained some trade waste. The Council's attention was drawn to it, and the source of contamination was traced to a discharge of acid drainage from scrap battery plates. The source of pollution has now been removed.

Norman Cross Rural District

Pollution of the River Nene at Alwalton by farm drainage has been overcome by passing it over grassland.

Norman Cross Rural District Council have been informed by the Ministry of Housing and Local Government that the provision of a temporary sewage disposal unit for a housing site in Oundle Road, Alwalton, is unnecessary, as it could be sewered to the new sewage disposal works at Sibson-cum-Stibbington, which it is expected will be completed about 12 months ahead of schedule. The Hancock proposals for the expansion of Peterborough may delay consideration of sewerage problems in the Nene Valley between the Great North Road and the City.

Northampton County Borough

In the early part of the year effluent from Northampton sewage disposal works varied from "good" to "unsatisfactory", but it was much improved by the substitution of 7 inch aeration domes for the original ones (70 per cent of which were only 4 inch). The discharge complied with the prescribed conditions throughout the summer, and (what is most unusual) throughout most of the winter, although at all times the free and saline ammonia figure remained high.

In November the Ministry of Housing and Local Government held a local investigation into the Council's proposal for improving the unsatisfactory sewerage in the Kingsthorpe Hollow area of the Borough.

Oakham Urban District

A polluting discharge from Oakham sewage disposal works was caused by the use there of an oil emulsifying agent following the accidental discharge to sewer of 2,000 gallons of diesel oil. Many thousand fish were killed in a lake about half a mile below the sewage works. The problem of the use of oil emulsifying agents was subsequently considered at a meeting of the Technical Committee of the Association of River Authorities.

Oundle and Thrapston Rural District

Although Oundle and Thrapston Rural District Council's Consultants have reported favourably on the possibility of diverting sewage from Glapthorn to the Oundle Urban District Council's sewage disposal plant, the two Councils have not yet reached agreement on the matter.

The Rural District Council were unable to obtain loan sanction for extensions to the Brigstock sewage disposal works, for which section 7 consent was granted three years ago.

The low dissolved oxygen content in the small gravel pit at Thrapston caused the death of a few fish, and obvious distress to many more between the 10th and 14th August. Between 9th and 12th October many thousands of fish were killed in the same pit. Similar fish mortalities have occurred in the past, and on every occasion it has been found that the water was almost completely de-oxygenated. The effluent from the overloaded and inadequate Thrapston sewage disposal works is discharged to the pit, and completion of a scheme of sewerage and sewage disposal for Thrapston and Islip should remedy the position. As the proposed scheme will take at least two years to complete, the Council have decided to carry out temporary remedial measures, including the preparation and seeding of two irrigation areas, and the use of chemical precipitation. The benefit of land irrigation will not be apparent until next year, but considerable improvement has already been achieved by the use of chemical precipitants.

A sewerage and sewage disposal scheme for Apethorpe and Woodnewton has been submitted to the Ministry of Housing and Local Government.

Peterborough Municipal Borough

Pollution of Fletton Spring was traced to a discharge of contaminated cooling water from a nearby cannery, and immediate steps were taken to divert it to the foul sewer. The Company also cleaned out the polluted part of Fletton Spring.

A pollution at Peterborough was caused by a discharge of potato washing water and vehicle wash-down water from the premises of a Potato Merchant. All potato washing waste is now discharged to the foul sewer, and an oil separator has been provided to retain oil from the vehicle washdown plant.

Pollution of the Werrington Brook by black slime discharged from a surface water outlet was caused by trade water from a horticultural company's premises. The discharge has now been diverted to the foul sewer.

The failure of a pump in the test shop of a large Engineering Company resulted in the contents of a sump being emptied into a nearby storm drain leading to the Edgerley Drain. To prevent any recurrence the Company have clearly identified all points where effluent may be discharged, and have prohibited personnel from using any point not so identified. It is hoped that this will reduce the number of minor oil pollutions which have been attributable in the past to this Company's premises.

Peterborough sewage works extensions have been almost completed, and for the most part effluent has conformed to the prescribed conditions.

Peterborough Rural District

A discharge from a paper mill at Helpston is one of the most polluting in the Welland Catchment, and although in the past 10 years some improvements have been made, a biological survey in 1964 showed that the effect extended some 8 miles below the point of discharge.

In June conditions were prescribed under section 1 of the Rivers (Prevention of Pollution) Act 1961 for the discharge of 900,000 gallons per day of trade effluent, the terms being that the effluent should not contain more than 40 milligrams per litre of suspended solids dried at 105°C. nor take up more than 30 milligrams per litre of dissolved oxygen in 5 days at 20°C. The Company were then installing a Sven-Pederson "Save-all", and a much larger Krofta Sedi-

Flotation unit. As completion of the latter was not expected until September the consent provided that the conditions should take effect from 1st October. Considerable difficulty has been experienced in the construction of the Krofta Sedi-Flotation unit, and it has been agreed that, provided satisfactory progress is apparent, the operation of the conditions will be deferred.

The performance of a sewage treatment plant at a Caravan Site has proved very unsatisfactory, and a disconnection of storm water from the foul sewerage system has achieved insignificant improvement. Further attention must be given to this works if a consistently satisfactory effluent is to be produced.

Premature operation of a storm sewage overflow at Eye sewage pumping station caused by a fault in the mechanism of the main sewage pumps has been remedied, but it seems that the Peterborough City foul sewerage system (into which the sewage from Eye is pumped) is inadequate to take the increased flow. Consultations are taking place between the City Council and the Rural District Council as to the best temporary expedient pending the improvement of sewerage in Peterborough.

Raunds Urban District

In July 1961 at an investigation into a proposed sewage disposal scheme for Stanwick, the Raunds Urban District Council were requested by the Ministry's Inspector to examine the possibility of sewerage Stanwick to an extended Raunds sewage disposal works. The effluent from both Raunds and Stanwick sewage disposal works continues to be unsatisfactory, and as no progress appears to have been made towards a new works the Council have been informed that no further building development should be permitted which would further overload the two plants. The County Planning Officer has been advised of the position and asked to co-operate. The Council have since obtained advice as to the cost of alternative schemes, and subject to Ministry approval, have decided to install extended aeration plant.

Oil pollution of the Town Brook at Raunds was caused by the timber company which had complained about the matter! The Company has been most careful to carry out all creosoting on tarpaulins, but some creosote had soaked into the ground and found its way into the Town Brook. All creosoting is now carried out on a concrete area draining to a sump from which creosote is returned for re-use.

South Kesteven Rural District

Following the Consultant's report on the Deeping St. James sewage disposal works, the South Kesteven Rural District Council have carried out certain minor remedial works to provide recirculation in an attempt to achieve immediate improvement in the quality of the effluent. Major works which will take considerable time are required.

The Council intend to proceed with all speed on a scheme of sewerage and sewage disposal to provide for a population of at least 10,000 in the Deepings, the provisional cost being about £250,000. A broad outline of the proposals has been submitted to the Ministry of Housing and Local Government in the hope that it may be dealt with expeditiously. In order not to aggravate the present position the Council have decided not to allow any significant development which would increase the loading of the existing Deeping St. James sewage disposal works.

Spalding Urban District

Effluent from a potato peeling and washing plant in Spalding with a B.O.D. of 1,700 milligrams per litre caused gross pollution, but the proprietors cleaned out and enlarged their settling pond, and recirculated the potato washing water which is now discharged to the public sewer. The B.O.D. of the potato washing water has been reduced to 57 milligrams per litre.

Discharges from Spalding Gas Works, and grossly polluting drainage from land used for

disposing of waste fruit and vegetables lead to complaints about the condition of the Cemetery Drain. Pollution from the Gas Works was reduced by diverting the worst quality liquors to the tidal River Welland. The Company responsible for the waste fruit and vegetable disposal have cleaned out the stream and are examining other methods of disposal.

The discharge of effluent from Spalding sewage disposal works to the tidal River Welland is invariably unsatisfactory, as the plant is very inadequate and provides little or no treatment.

Trade waste from the British Sugar Corporation's Spalding factory has been very unsatisfactory, and work is now in hand on the construction of a 150 ft. diameter clarriflocculator to supplement the existing 100 ft. tank. The new unit should be in operation for the next campaign and it should result in a considerable improvement.

Stamford Borough

Some pollution of the Welland at Stamford occurred in October due to the failure of an automatic ejector which caused an emergency overflow to operate. Other polluting discharges were caused by the premature operation of storm sewage overflows into the surface water sewerage system, and contamination of surface water by barrel washing water at a local brewery. The latter trade waste is now discharged to the foul sewer. Work has started on a new sewerage scheme for the Borough, and its completion should do much to alleviate the recent difficulties.

Towcester Rural District

Pollution of a tributary of the River Nene at Blisworth was caused by the failure of a pump used to pump sewage from a caravan site to the foul sewer. A standby pump has now been installed to prevent a similar incident.

Wellingborough Urban District

A request to allow a discharge to the River Isle of 30,000 gallons of gasholder sealing water was refused after analysis had shown the quality of the water to be unacceptable for a direct discharge. It was subsequently disposed of by being passed at a controlled rate to the foul sewer.

Wellingborough and District—Proposed Regional Drainage Scheme

No further progress appears to have been made by the several local authorities in reaching agreement as to the proposed regional drainage scheme. In the meantime it is becoming increasingly obvious that little or no improvement in the condition of the middle (industrial) section of the River Nene can be achieved without a scheme for dealing adequately with the difficult trade effluents produced in the leather industry. The fact that water may now have to be taken for public supply from the river downstream of this "black" industrial reach makes an improvement most essential and urgent.

Wellingborough Rural District

Work on Earls Barton sewage disposal works was delayed for a long time by the Contractors going out of business, but the plant at last came into operation towards the end of the year.

Trade effluent notices have been served on two industrialists discharging to the Wollaston sewage disposal works, and pre-treatment will be required at the factories. Unfortunately Wollaston sewage disposal works has failed to achieve the Rural District Council's expectations, and produces an unsatisfactory effluent. The extended works became fully operative in October, 1964, and the 20 samples of effluent since then have all failed to conform to the prescribed conditions. The Council attribute the difficulty to strong trade wastes, and considerable improvement is expected when pre-treatment is in operation.

Wisbech Rural District

Many of the small sewage disposal plants in this district are still failing to produce satisfactory effluents in spite of recirculation and improved filter ventilation.

5. REMEDIAL ACTION

Much of the action which separately and collectively is intended to achieve the object of the Rivers (Prevention of Pollution) Acts 1951-61 has been referred to fully in section 4. Some progress, albeit small, has been made. In no case in the past year has it been considered that there was any indifference or culpability on the part of local authorities and industrialists such that it was necessary to resort to legal proceedings. That is not to say that the progress and initiative shewn by some local authorities and industrialists in achieving these obligations has been regarded as entirely satisfactory. National financial restrictions, delay in obtaining plant, initial trouble and mechanical defects in new plant, and difficulties by industrialists in finding ways and means of providing adequate pre-treatment for trade waste have all frustrated the improvements which are necessary.

The proposed major expansion of Northampton, which discharges its sewage into the upper reaches of the Nene where the dilution is already totally inadequate, makes it necessary to extend the works substantially and to install a plant with the greatest possible efficiency. The present activated sludge plant has not been entirely satisfactory for the conditions prevailing, and it is probable that a radical reconsideration of the whole problem could have very beneficial results for the part of the Nene which has caused much concern.

As the Clerk of the Authority said in a paper to the Second British Coarse Fish Conference held at Liverpool University, the primary purpose of the Water Resources Act 1963 is to meet the growing demand for water. It is essential that rivers should be used and not abused, and that must be achieved by producing effluent of the highest possible quality, and not by using good water to dilute poor effluent. The Act requires better and more intelligent use of water. Water is now "money" in a way that it has never been before. Sewage authorities and industrialists can no longer be permitted to think of the river as primarily a means of fluming waste products to the sea. The standards of 1915 must now be regarded as what they are, the minimum, and the proper and efficient use of our rivers demands something higher.

Fortunately for many years few, if any, rivers in this country could be regarded as a danger to public health—the pollution prevention criterion in relation to the determination of a minimum acceptable flow. The endeavour of the River Board was to restore the wholesomeness of rivers, primarily for fishing and amenity purposes, and it is perhaps not surprising that when a river in an industrial district was devoid of fish there was no great incentive to face up to the expense of pollution prevention work.

Shortly before the establishment of the Authority the advisers of one local authority complained that the River Board were being very unreasonable in requiring the Council to produce a sewage effluent of higher quality than that recommended by the Royal Commission, but they accepted that the River Authority would have to set higher standards in view of their new responsibilities.

Water conservation generally, and the proposal to make a major abstraction at Elton for a storage reservoir in Rutland, in particular, emphasise the importance of raising standards to ensure that river water is of an acceptable quality to meet the demands made on it.

It is regretted that there is no apparent evidence of progress in reaching agreement on the Regional Sewage Scheme for Wellingborough and the adjoining Urban Districts. A large and efficient modern plant, under specialised technical supervision treating a liquor in which the trade waste can be balanced with adequate domestic sewage to produce a tractable liquor, should result in a substantial improvement as compared with the several discharges from the small overloaded and obsolete sewage works.

6. STATISTICS RELATING TO POLLUTION CONTROL

DISCHARGES INTO STREAMS REQUIRING CONSENT UNDER SECTION 7 OF THE 1951 ACT

	<i>Consents and notices issued during year</i>	<i>Refusals during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	33	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	6	nil
(c) Effluents from trade premises	4	nil
(d) Farm effluents	nil	nil
Totals	43	nil

DISCHARGES INTO TIDAL WATER REQUIRING CONSENT UNDER SECTION 7 OF THE 1951 ACT AS EXTENDED BY SECTION 1 OF THE 1960 ACT

	<i>Consents and notices issued during year</i>	<i>Refusals during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	nil	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	1	nil
(d) Farm effluents	nil	nil
Totals	1	nil

REVIEWS OF CONDITIONS OF CONSENT UNDER SECTION 5 OF THE 1961 ACT

	<i>Consents reviewed during year</i>	<i>Consents varied during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	3	3
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	1	1
(d) Farm effluents	nil	nil
Totals	4	4

DISCHARGES INTO UNDERGROUND STRATA REQUIRING CONSENT UNDER
SECTION 72 OF THE 1963 ACT

	Consents issued during year	Refusals during year
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	11	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	nil	1
(d) Farm effluents	nil	nil
(e) Other miscellaneous discharges	nil	nil
Totals	11	1

EXISTING DISCHARGES INTO STREAMS UNDER
SECTION 1 OF THE 1961 ACT

	Total number of applications received
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	982
(b) Effluents from storm sewage overflows and storm sewage tanks	31
(c) Effluents from trade premises	34
(d) Farm effluents	367
Totals	1,414

EXISTING DISCHARGES INTO UNDERGROUND STRATA UNDER
SECTION 73 OF THE 1963 ACT

	Total number of applications received
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	26
(b) Effluents from storm sewage overflows and storm sewage tanks	nil
(c) Effluents from trade premises	1
(d) Farm effluents	nil
(e) Other miscellaneous discharges	nil
Totals	27

7. RESEARCH

No research into pollution prevention problems has been carried out.

RIVER NENE—ANALYTICAL RESULTS

Sampling Point	Miles from Source		pH	Sus- pended Solids	Chloride (Cl.)	F & S Ammonia (N)	Nitrates (N)	4 hrs. P.V.	5 day B.O.D.	D.O. % Satura- tion	Water Temp. °C	Flow m.g.d.
1. Non Tidal Sampling Points												
Dodford Road Bridge	5	Average Value	—	13	27	trace	2.05	2.5	2.1	106.5	9.5	
		Maximum Value	8.05	20	35	trace	4.7	4.	2.7	115.5	13.5	
		Minimum Value	7.6	10	21	trace	trace	1.4	1.5	102.5	4.	
Weedon A.45 Road Bridge	—	Average Value	—	5	56	0.10	3.5	3.	2.4	107.	9.	8.1
		Maximum Value	8.15	10	80	0.55	5.7	4.2	3.4	118.5	14.	16.9
		Minimum Value	7.65	trace	38	trace	Nil	1.8	1.6	98.	3.	2.4
Kislingbury	12	Average Value	—	7	46	0.7	3.5	2.95	3.9	96.	9.5	19.1
		Maximum Value	8.15	15	52	1.6	5.6	4.2	5.3	110.5	15.5	37.4
		Minimum Value	7.7	trace	36	0.2	Nil	1.6	3.05	83.5	2.5	8.9
Boughton Crossing	—	Average Value	—	11	47	0.3	5.9	3.1	3.6	90.5	9.	15.7
		Maximum Value	7.55	30	56	0.7	8.3	4.4	6.6	100.5	14.	29.1
		Minimum Value	7.2	5	40	trace	2.	1.6	1.9	83.5	2.5	4.8
South Bridge, Northampton	17	Average Value	—	3	51	0.45	4.6	3.4	2.9	87.5	10.	
		Maximum Value	8.0	10	60	0.95	7.	5.	3.7	103.5	16.	
		Minimum Value	7.7	trace	42	trace	Nil	2.2	2.1	78.	3.	
Billing Bridge	22	Average Value	—	10	59	0.1	4.3	3.6	2.6	99.	15.	38.1
		Maximum Value	8.4	20	71	0.45	9.5	5.4	5.	153.5	21.	77.3
		Minimum Value	7.7	5	40	Nil	Nil	2.	0.4	79.	8.	15.6
White Mills	25	Average Value	—	7	78	6.3	4.	6.2	7.	66.5	14.	
		Maximum Value	8.1	15	99	13.5	8.5	15.2	12.1	95.5	19.	
		Minimum Value	7.4	trace	49	2.05	Nil	2.8	2.3	19.5	6.	
Hardwater Mill	27	Average Value	—	5	79	7.	4.1	6.2	8.2	73.5	14.	51.1
		Maximum Value	8.15	15	91	13.9	7.9	8.6	21.	106.5	20.	95.4
		Minimum Value	7.5	trace	53	2.15	trace	3.2	2.9	38.0	6.	25.0
Wellingborough Road Bridge	30	Average Value	—	8	76	5.9	4.2	5.9	10.4	74.	13.5	
		Maximum Value	8.1	20	96	12.6	8.4	9.6	18.	105.5	19.5	
		Minimum Value	7.4	trace	50	1.4	trace	3.	4.7	47.5	4.5	
River Ise, Wellingborough	—	Average Value	—	11	61	0.7	7.1	5.	4.4	88.	10.5	22.+
		Maximum Value	8.05	25	70	1.3	8.3	6.6	7.5	103.	16.	37.4
		Minimum Value	7.5	5	48	0.3	5.2	2.8	2.6	70.5	3.5	9.3
Ditchford Mill	32	Average Value	—	7	75	4.4	5.	5.8	8.7	71.5	13.5	
		Maximum Value	8.0	10	92	9.4	9.5	8.4	15.	100.	19.	
		Minimum Value	7.45	trace	48	1.05	trace	3.2	4.	41.5	4.	
Irthlingborough Old A.6 Bridge	34½	Average Value	—	7	82	4.	6.4	5.9	9.1	77.5	13.5	
		Maximum Value	8.1	10	100	9.	10.2	8.	14.	103.5	19.	
		Minimum Value	7.55	trace	54	0.55	4.4	2.2	6.3	54.	4.	
Ringstead Lower Lock	38	Average Value	—	6	92	3.2	6.2	5.5	8.3	76.5	13.5	
		Maximum Value	8.1	15	120	6.3	9.6	7.4	16.	123.	18.5	
		Minimum Value	7.25	trace	56	0.2	trace	3.2	4.4	42.	4.	
Thrapston	42	Average Value	—	8	86	2.15	6.1	5.5	7.7	89.5	13.5	
		Maximum Value	8.05	20	116	4.	8.	7.4	15.	172.	18.5	
		Minimum Value	7.55	trace	52	0.25	4.4	2.8	2.9	54.	3.5	
Oundle New Bridge	55	Average Value	—	6	82	0.65	6.3	4.3	5.2	98.	11.	
		Maximum Value	8.35	15	96	1.8	7.9	5.4	12.5	127.5	17.	
		Minimum Value	7.75	trace	53	trace	4.4	2.8	2.75	77.	3.	

Sampling Point	Miles from Source		pH	Suspended Solids	Chloride (Cl.)	F & S Ammonia (N)	Nitrates (N)	4 hrs. P.V.	5 day B.O.D.	D.O. % Saturation	Water Temp. °C	Flow m.g.d.
Fotheringhay	59	Average Value	—	7	77	0.75	6.2	4.1	5.2	103.5	11.5	
		Maximum Value	8.4	20	90	1.6	7.9	5.8	14.5	146.	18.5	
		Minimum Value	7.75	trace	52	trace	4.2	2.4	2.5	81.5	3.	
Wansford Old A.1 Bridge	66	Average Value	—	7	85	0.5	6.9	3.9	5.	106.5	11.	
		Maximum Value	8.6	20	103	1.55	8.	5.4	13.5	136.5	18.	
		Minimum Value	7.9	trace	54	trace	5.1	2.6	2.2	97.	3.	
Peterborough Bridge	77	Average Value	—	10	85	0.85	6.2	3.8	5.9	107.5	14.5	96.9
		Maximum Value	8.7	25	116	2.2	7.8	5.	11.8	143.5	22.	201.
		Minimum Value	7.9	trace	52	trace	3.7	2.4	2.7	92.5	5.5	29.5
Dog in a Doublet Upstream of Sluice	82	Average Value	—	7	83	0.85	6.1	3.6	4.8	95.	12.	
		Maximum Value	8.75	20	112	2.05	8.2	4.8	9.3	131.	19.	
		Minimum Value	7.95	5	55	trace	4.3	2.8	2.3	80.	3.	
2. Tidal Sampling Points												
Dog-in-a-Doublet Road Bridge	82	Average Value	—	16	88	3.1	4.6	5.6	7.7	84.	12.5	
		Maximum Value	8.25	50	134	14.3	8.6	13.8	25.	103.	17.	
		Minimum Value	7.65	5	60	0.4	2.2	2.4	2.	37.5	5.	
Guyhirn Road Bridge	91	Average Value	—	102	95	1.6	5.1	7.5	9.6	69.5	12.	
		Maximum Value	8.2	165	114	4.05	7.8	12.2	20.	94.5	17.	
		Minimum Value	7.6	22	76	0.65	1.2	5.	4.3	47.	4.5	
Wisbech Town Bridge	97	Average Value	—	129	270	1.3	6.1	7.6	9.8	62.	12.	
		Maximum Value	8.2	225	810	3.15	7.7	10.8	18.	98.5	17.	
		Minimum Value	7.5	32	104	trace	4.1	4.8	4.6	19.5	5.	
Sutton Bridge	105	Average Value	—	94	1645	0.9	4.2	6.4	5.	64.5	11.5	
		Maximum Value	8.75	230	3460	2.25	6.9	8.4	6.9	93.	16.	
		Minimum Value	7.4	10	86	trace	trace	4.4	2.8	45.5	4.	

RIVER WELLAND—ANALYTICAL RESULTS

Lubenham/Marston Trussel Road	4	10.6.65	7.95	5	38	0.45	nil	4.6	4.4	77.	15.	0.23E
		19.9.65	7.8	10	30	0.2	2.3	3.6	3.4	92.	14.5	1.53E
A.427 Road Bridge Downstream of Market Harborough	7½	10.6.65	7.85	10	62	0.4	nil	12.	9.	36.	18.5	0.24E
		16.9.65	8.0	10	42	0.4	2.1	4.4	3.3	93.	15.	1.8 E
Welham	12	10.6.65	7.85	10	50	3.8	2.2	7.2	12.	52.5	17.5	3. E
		16.9.65	8.0	15	42	0.75	2.6	4.6	2.3	83.	15.	14.3 E
Ashley	15	10.6.65	8.2	5	52	2.2	3.4	6.	7.3	138.5	18.	3. E
		16.9.65	8.1	15	40	0.75	2.8	4.6	4.3	81.5	15.	14.3 E
Rockingham	21½	10.6.65	8.5	51	5	0.25	3.	4.6	3.7	142.5	18.	3.8 E
		16.9.65	8.15	10	38	0.35	1.7	4.4	2.5	91.	16.	15.5 E
Eyebrook at Caldecott	—	10.6.65	8.3	15	41	0.15	nil	3.6	3.4	111.	18.	0.7
		16.9.65	8.1	5	34	0.1	nil	3.6	2.35	83.5	15.	0.7
Gretton, Upstream of Sluice	24½	10.6.65	8.5	5	50	0.3	2.9	5.2	6.1	102.5	19.	5.2 E
		16.9.65	8.25	10	40	0.3	1.9	4.4	2.7	84.5	16.	17.5 E
Collyweston	39	10.6.65	8.6	trace	47	0.1	1.4	2.4	2.1	137.	18.5	5.2 E
		16.9.65	8.3	5	40	0.15	1.6	3.6	2.1	98.5	16.	17.5 E
River Chater at Station Road, Ketton	—	10.6.65	8.3	5	32	0.1	4.1	1.4	2.05	103.	16.	1.3 E
		16.9.65	8.25	10	30	0.15	3.1	2.8	2.	104.5	15.	3.3 E
Stamford Swimming Pool	43½	10.6.65	8.45	5	43	0.15	3.2	2.4	3.25	108.	18.5	6.5 E
		16.9.65	8.35	5	38	0.15	2.9	4.	2.25	105.5	16.	20.8 E

Sampling Point	Miles from Source		pH	Suspended Solids	Chloride (Cl.)	F & S Ammonia (N)	Nitrates (N)	4 hrs. P.V.	5 day B.O.D.	D.O. % Saturation	Water Temp. °C	Flow m.g.d.
River Gwash, upstream of confluence with Welland	—	10.6.65	8.45	95	33	0.35	4.2	2.8	5.2	107.5	19.	5.5 E
		16.9.65	8.45	20	30	0.1	3.	3.	2.7	110.5	16.	6.4 E
Uffington	46½	10.6.65	8.95	5	44	0.25	3.2	2.8	5.	176.5	20.	12.2 E
		16.9.65	8.4	10	38	0.35	3.1	4.8	3.35	101.	16.	27.4 E
Deeping St. James	53	10.6.65	9.05	10	43	0.4	2.6	4.6	9.5	198.	20.	
		16.9.65	8.4	5	36	0.2	2.8	2.8	2.8	100.5	16.	
Crowland Bridge	59	10.6.65	8.75	15	49	0.45	nil	3.6	13.	184.	19.5	
		16.9.65	8.3	15	38	0.25	1.9	4.	3.7	87.	16.	
Inlet to Coronation Channel, Spalding	67½	10.6.65	8.5	5	51	0.25	nil	3.2	9.1	139.	19.	
		16.9.65	8.2	22	32	0.6	2.0	4.	4.25	76.5	16.	
Tidal Sluice, Coronation Channel	70	10.6.65	8.45	10	63	0.35	nil	3.	7.7	133.5	19.	
		16.9.65	8.2	19	32	0.6	2.3	8.8	4.3	76.5	16.	

E = Estimate

RIVER ISE—ANALYTICAL RESULTS

Clipston and Oxendon Station	3	23.9.65	8.1	5	33	0.45	nil	3.	3.4	78.5	12.5	
		16.2.66	7.3	10	28	trace	4.	2.8	2.6	96.5	3.	
Arthingworth	4	23.9.65	8.2	5	30	0.2	nil	3.	2.	84.5	12.	
		16.2.66	7.4	10	28	trace	4.3	3.4	2.1	97.5	3.	
Newbottle Bridge	6	23.9.65	8.3	trace	31	0.1	nil	3.	1.75	86.5	12.5	
		16.2.66	7.5	5	28	trace	5.3	3.	2.55	98.5	3.	
Rothwell/Desborough Road Bridge	8	23.9.65	8.4	trace	31	0.1	nil	3.4	1.7	87.5	12.5	
		16.2.66	7.55	5	28	trace	4.8	2.8	2.3	97.5	3.	
Rushton Bridge	10	23.9.65	8.25	trace	44	0.25	2.6	3.4	3.05	71.	12.5	
		16.2.66	7.55	5	32	trace	5.7	3.	2.2	97.5	3.	
Barford Bridge	11½	23.9.65	8.2	trace	39	0.1	3.6	3.	2.	78.5	12.	
		16.2.66	7.65	5	32	trace	5.9	2.8	2.35	96.5	3.	
Geddington A.43 Road Bridge	13½	23.9.65	8.5	trace	38	0.1	2.7	3.	2.	104.5	12.5	
		16.2.66	7.65	5	32	trace	6.4	2.4	2.2	98.5	3.5	
Warkton Bridge	15	23.9.65	8.5	trace	42	0.2	3.6	2.6	1.85	99.	12.5	
		16.2.66	7.7	10	36	trace	6.4	2.	2.8	101.	3.5	
Barton Seagrave	17	23.9.65	8.5	trace	40	0.1	3.3	3.4	2.1	95.	13.	
		16.2.66	7.7	10	36	trace	6.5	2.8	2.7	101.	3.5	
Slade Brook Pychley Road A.504	—	23.9.65	8.55	10	62	0.35	5.1	3.	2.9	93.	13.	
		16.2.66	7.7	10	38	0.4	6.4	2.8	3.55	98.5	4.	
Burton Latimer	18½	23.9.65	8.7	10	48	0.3	2.	5.	7.2	128.	14.	
		16.2.66	7.8	10	38	0.3	7.	2.8	3.5	101.	4.	
Finedon Station	19½	23.9.65	8.2	10	46	0.35	2.	5.4	9.25	155.5	15.	
		16.2.66	7.8	10	38	0.3	6.5	2.2	2.75	99.	4.	
Harrowden Road	21	23.9.65	8.4	10	66	0.7	6.	6.6	9.2	126.	15.5	10.2*
		16.2.66	7.8	10	40	0.55	7.	2.8	3.5	98.5	4.	57.4
Finedon Road	22	23.9.65	8.3	10	62	0.8	7.4	6.6	9.15	106.5	15.	
		16.2.66	7.8	10	40	0.6	6.6	3.2	4.1	98.5	4.	
Morris Motors Wellingborough	22½	23.9.65	8.2	10	72	0.65	2.4	7.6	8.	96.5	15.	
		16.2.66	7.8	10	40	0.55	7.	3.6	5.15	95.5	4.	

* Flow at Harrowden Road includes an allowance of 2.5 m.g.d. for sewage effluent discharged from Kettering Borough.