ilio-femoral thrombosis. On the fifth day of treatment, when the prothrombin level was 28% of normal, numerous petechial haemorrhages appeared along the line of the saphenous vein and its tributaries (a septic thrombosis had previously been present in this vein following an intravenous drip). On the sixth day these petechial haemorrhages had spread round the leg and thigh, and large blood blisters were present around the drip scar and on the posterior surface of the thigh. The capillary resistance, however, was within normal limits in both the normal and the affected foot. Possibly sepsis and, in the thigh, pressure from a bed-pan may have been the causal factors. No further haemorrhage occurred when anticoagulant therapy was discontinued.

Discussion

We feel that bis-3,3′-(4-oxycoumarinyl) ethyl acetate is certainly a step forward towards the production of an ideal anticoagulant, but it is still necessary to take the precautions advocated for this type of therapy. Prothrombin estimations should be carried out daily, in a reliable laboratory by a recognized technique, before the desired level is reached, and at least every other day while the patient is under treatment. If this precaution is not rigorously adhered to there is a danger of haemorrhage, though this is unlikely to be severe, since the elimination of B.O.E.A. is more rapid than with dicoumarol. The case illustrated in Fig. 7 shows, however, that overdosage may cause a haemorrhagic episode.

Summary

Clinical results in 126 patients with venous thrombosis, pulmonary emboli, arterial thrombosis, or emboli who have been treated with a new coumarin compound, bis-3,3′-(4-oxycoumarinyl) ethyl acetate for periods varying from five days to ten months are reported.

In over 80% of cases given adequate dosage the prothrombin level of the blood was reduced to under 50% of normal within 36 hours of the start of treatment, and it returned to over 50% of normal within the same period after withdrawal of the drug. No gross cumulative effect of the drug has been observed, although in 12% of cases the prothrombin level remained below 50% of normal for periods up to four days after discontinuing the substance.

Apart from slight nausea and vomiting in a small number of subjects, due possibly to the bitter taste of the tablets, no toxic effects were noted.

Transient haematuria, through erroneous overdosage, occurred in one patient, petechial haemorrhage developed in the thrombosed limb in another, and one patient with congestive heart failure developed a haematemesis during treatment.

While under treatment two patients died from causes not attributable to the anticoagulant therapy.

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ISOLATION OF SALMONELLAE FROM DOGS, CATS, AND PIGEONS

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During the last ten years there has been a great increase in the number of reported outbreaks of food-poisoning in this country, the majority of the cases of the "infection" as opposed to the "toxin" type being due to organisms of the salmonella group. Part of the increase is no doubt due to better diagnosis and reporting, but a considerable proportion is real. Interest in the possible reservoirs and vehicles of salmonella infection has been stimulated, and, in addition to the well-known sources, of which rodents, pigs, cattle, and duck eggs are the most important, certain new sources have been recognized, particularly imported spray-dried egg. The origin of many cases, however, remains obscure, and it seemed of interest to determine whether salmonella infection was prevalent in dogs and cats in view of their close domestic contact with man and his food. Further stimuli to the investigation were the extent to which streets and pavements are fouled with dog faeces, and the frequent observation of cats with free access to unprotected foods in shops. The work was extended to include examination of a number of specimens from pigeons.

Dogs

There are numerous reports of the isolation of salmonellae from dogs suffering from septicaemia, diarrhoea, and other conditions. The most extensive data are provided by Bruner and Moran (1949), who give an account of 2,788 cultures from 32 animal species other than man or fowls studied during a period of 16 years at the Kentucky Experiment Station. The majority of the cultures were from swine, but dogs, with 103 strains, came second on the list. No fewer than 26 different salmonella types were isolated from dogs, of which the most frequent were *Salm. typhi-murium* (accounting for 40% of outbreaks), *Salm. cholerae-suis, Salm. oranienburg, Salm. newport,* and *Salm. anatum.* Bruner and Moran state that salmonella infection is usually a septicaemic condition in lower animals but that asymptomatic carriers may occur. Their work was, of course, not a survey but a record of the identification of organisms submitted from a wide area, probably mostly from sick animals.

Wolff, Henderson, and McCallum (1948) reported the results of the examination of rectal swabs from 100 dogs in a veterinary clinic, an animal shelter, and a crowded insanitary private kennel in Michigan. A remarkably high rate of infection was recorded. Sixteen different salmonella types were isolated from 18 of the dogs; one dog yielded five different types in the course of six swabbings. Many of the dogs had enteritis, or a history of enteritis, but a considerable number were clinically normal at the time of examination. Although the source of the infections was not determined, it is significant that the diet of the animals

in the most heavily infected institution included a supply of rejected candled eggs, and that many of the salmonella types isolated were those commonly found in poultry and eggs in the United States. Wolff (1947) has also discussed the public-health significance of animal salmonella infections, and mentions that at least three human outbreaks have been traced to dogs as the probable source. The best known is that reported by Caspersen (1937), who investigated six cases of paratyphoid B fever in Rakkestad, Norway, and concluded that the most probable source of infection was a dog which had had a diarrhoeal illness for 14 days before the occurrence of the first human case; the organism was not isolated from the dog, but H and O agglutinins were present in its blood and were not found in the blood of 23 other dogs. Comment on this outbreak appeared in the *Lancet* (Editorial, 1938).

Magnusson (1938) described an epidemic of salmonella infection in a Swedish village in which the source of infection was probably a stray dog which had an abortion and diarrhoea during the preceding week; *Salm. abortus canis* was isolated from the dog and from three of the patients. This organism is regarded by Kauffmann as a variant of *Salm. paratyphi B*, to which it is closely related antigenically. Kauffmann and Henningsen (1939) isolated *Salm. glostrup* from the faeces of patients in a family outbreak of gastro-enteritis, and from the faeces and blood of a dog that was ill at the same time. Taylor (1949) mentions the isolation of *Salm. thompson* from a dog with diarrhoea. It may be noted that this type has appeared not infrequently in recent human infections in this country and that, although it is known to be common in poultry in some areas, the actual source of the infections in man remains obscure.

Reitler and Menzel (1946) have described a peculiar disease of dogs in Palestine. It affects dogs living in groups, it may assume an acute or a chronic form, and it is associated with tick infestation. A salmonella with the antigenic formula VI, XIV, XXIV : r–1, 7 was isolated from the blood of two dogs. Kauffmann (1947) states that this organism has been identified as *Salm. bovis morbificans*. Examination of a large number of ticks failed to show this salmonella, but *Salm. enteritidis* was isolated from one tick obtained from a sick dog possessing agglutinins to the same organism. The suggestion is that ticks may be occasional transmitters of natural salmonella infection, such transmission having been shown by Parker and Steinhaus (1943) to be experimentally possible. Venske (1933) did not isolate a salmonella from numerous samples of faeces obtained from 163 dogs suffering from various diseases, but it is to be noted that at that date methods of isolation were less effective than those now available.

Own Observations

Of the 500 specimens of canine faeces examined, 437 were obtained from a large kennel in London which was responsible for the care of stray dogs found in the metropolitan area. The samples were collected weekly, and, since none of the dogs were kept at the institution for longer than seven days, a completely new set of dogs was examined at each collection. There were seldom fewer than 300 dogs in the kennels at any one time, and they were considered to be a fair sample of the dog population of London. The standard of hygiene was high, and all the dogs appeared clinically normal. The remaining 63 samples were collected from the streets in various parts of London.

The method of examination was as follows. Cultures were made on Leifson's desoxycholate-citrate agar, as modified by Hynes (1942), directly and after enrichment for 18 hours in selenite medium and for 10 hours in tetrathionate broth. The enrichment media were prepared by the methods recommended by Leifson (1936) and Knox, Gell, and Pollock (1942). The plates were inspected for suspicious non-lactose-fermenting colonies, of which several were marked and picked to tubes of 2% urea in Clark and Lubs's phosphate buffer at *p*H 7.2 (Elek, 1948). After incubation for three hours in the water-bath at 37° C. the tubes were tested with Nessler's reagent for ammonia production, and the negative colonies were subcultured into peptone water and on to agar slopes, which were incubated until the following day. The peptone water was used for the indole test, and the agar slopes of the indole-negative organisms were used for the further morphological, biochemical, and serological study of the organisms. Motility and the usual fermentation reactions were studied, and slide agglutinations were carried out with polyvalent H and O, and if necessary with group-specific O and phase 1 and 2 H antisera obtained from the Standards Laboratory. Organisms giving positive slide-agglutination were submitted to a full tube test, and in certain cases identification was completed by determining fermentation reactions in the rarer sugar media. In a number of instances final identification or confirmation of a salmonella was made at the Salmonella Reference Laboratory, Colindale.

Results.—From the 500 specimens of faeces from dogs five salmonellae were isolated, a frequency of 1%. The organisms were *Salm. newport* (2 specimens), *Salm. typhi-murium* (2 specimens), and a salmonella of doubtful identity. The last-named was an organism with the typical morphological, cultural, and biochemical characters of a salmonella, possessing flagellar antigenic factors "g, p." The somatic antigens could not be identified owing to the roughness of the strain, and attempts to produce smooth organisms by mouse passage did not succeed. Dr. Joan Taylor suspected that this organism was originally a strain of *Salm. dublin*, but there could be no complete proof that this was so. The positive cultures were all obtained from samples collected in the institution.

Cats

Bruner and Moran (1949) in the work referred to above obtained 34 cultures, belonging to 17 different salmonella types, from cats, many of which were known to be apparently healthy. Wolff (1947) makes the comment that, although cats constantly eat rats and mice, only two reports of salmonella infection, with *Salm. cholerae-suis* and *Salm. paratyphi A*, were at that time known to him. McNeil and Hinshaw (1944), investigating the possible sources of *Salm. typhi-murium*, which was a cause of severe economic loss in turkey poults, refer to the isolation of this organism from two cats on infected turkey ranches; snakes and house-flies were also found to be infected. Salsamendi (1936) isolated *Salm. anatum* from a cat with enteritis which proved fatal. A series of fatal infections with *Salm. typhi-murium* in laboratory stock kittens is described by van Dorssen (1937a), infected mice being the probable source of infection. Subcutaneous injection of the organism into cats produced rapid death, and feeding experiments resulted in a non-fatal infection of about half the animals, with persistence of the organism in the mesenteric glands. In the survey by Venske (1933), already mentioned, no salmonellae were isolated from 48 faecal specimens from 18 cats suffering from various diseases.

In a few instances disease in a cat has been associated with human infection. Kauffmann and Henningsen (1938)

isolated *Salm. braenderup* from the faeces of a man suffering from enteritis and from his cat, which had died of a diarrhoeal illness. Taylor (1949) reports the infection of a child in this country with *Salm. typhi-murium* from a cat, and the same worker (Wilson and Miles, 1946) identified *Salm. concord* from a case of acute gastro-enteritis in a child on a farm, and from her cat.

Own Observations

Of the 500 specimens of feline faeces examined, 458 were obtained from cats, mainly in North London, that had been destroyed because their owners no longer wished to keep them. The animals were killed either by electrocution or by shooting, and the samples were collected usually within 20 hours of death by expressing faeces from the rectum by pressure on the abdomen or by means of rectal swabs. The manager of the organization stated that the vast majority of the cats were destroyed for reasons other than ill-health. Specimens were very rarely taken from cats showing any sign of illness, and the cultures made from two cats that had probably died of disease were negative for salmonellae. The cats from this source were regarded as an average sample of London cats with respect to age and breed. The other 42 specimens consisted of rectal swabs from healthy live cats brought to the Royal Veterinary College.

The bacteriological investigations were carried out by the same methods as were used for the dogs.

Results.—From seven of the 500 specimens of faeces from cats salmonellae were isolated—a frequency of 1.4%. The organisms were identified as *Salm. typhi-murium* (three specimens), *Salm. anatum* (two specimens), *Salm. montevideo,* and *Salm. paratyphi B.* The strains were typical in all respects. The strain of *Salm. paratyphi B* was submitted to the Salmonella and Enteric Reference Laboratories of the Central Public Health Laboratory, Colindale, for confirmation. It was reported by Dr. Joan Taylor to be a typical strain of *Salm. paratyphi B,* possessing the antigenic structure IV, V, XII:b–1, 2, and by Dr. E. S. Anderson to be a Vi strain untypable by the Vi-phages of Felix and Callow (1943) that are at present available.

Pigeons

There are numerous reports in the literature indicating that *Salm. typhi-murium* is a frequent cause of disease in pigeons. Clarenburg and Dornickx (1932) record what is believed to be the first instance of human infection with this organism traced to pigeons. Twenty persons were attacked with gastro-enteritis after eating a pudding containing pigeons' eggs, and *Salm. typhi-murium* of the same biochemical and serological type was isolated from the pudding, from the infected persons, and from the pigeons which had produced the incriminated eggs. That paper gives numerous references to the frequency of this salmonella in disease of pigeons.

Edwards (1935, 1938) has made the interesting observation that somatic antigen V is almost always absent from pigeon strains of *Salm. typhi-murium.* These variants possessing only somatic antigen IV are referred to as the Copenhagen variety. They have been further discussed by Edwards and Bruner (1943) and by Bruner and Moran (1949), who found that they constituted 97.5% of all *Salm. typhi-murium* strains from pigeons and only 2.4% of those from other sources. Hohn and Herrmann (1937) also found that all of 11 strains from pigeons, including those from the human outbreak reported above, were of the Copenhagen type. Edwards states that " it is well known that food-poisoning may be caused by the consumption of pigeons or the eggs of pigeons infected with *Salm. typhi-murium,*" and that " the occurrence of IV-variants of *Salm. typhi-murium* in food-poisoning indicates that the infection was contracted directly or indirectly from pigeons." Cruickshank (1943) has reported the occurrence of a urinary infection with *Salm. typhi-murium* in a woman following close association with pigeons in her home.

Own Observations

The total number of specimens of pigeons' faeces examined was 133. Three of these were obtained from stray pigeons that had been destroyed. Seventeen were from various exotic breeds which were being exhibited at a poultry show. The remaining 113 specimens were collected in the early morning in Trafalgar Square, London.

Results.—From three of the 133 specimens of faeces from pigeons salmonellae were isolated—a frequency of 2.25%. All the strains proved to be *Salm. typhi-murium.* It was reported by Dr. Joan Taylor that only one of the three strains possessed somatic antigen V. Two of the strains were obtained from the stray pigeons, which were obtained at different times and had no connexion with one another ; one of these possessed antigen V. The other culture of *Salm. typhi-murium* was isolated from a sample obtained in Trafalgar Square.

Comment on Bacteriological Findings

The isolation of 15 salmonellae from a total of 1,133 specimens presented an opportunity of assessing the relative value of the media used. By far the most successful procedure was enrichment in selenite broth for 18 hours followed by plating on desoxycholate-citrate agar. On only one occasion was there failure to detect a positive specimen by this routine ; on this occasion *Salm. typhi-murium* appeared on direct plating, and there was reason to suspect that the selenite medium, a new batch, was unsatisfactory. In our hands tetrathionate broth gave poor results, and on the direct desoxycholate plates the salmonellae were often obscured by a heavy growth of other non-lactose-fermenting colonies.

It soon became evident that the bacterial flora of the animal faeces differed from that of human faeces, and that the flora of the different animal species differed from one another. It was of interest to analyse the findings in regard to organisms which appeared as non-lactose-fermenters after 24 hours' incubation of the plates. Many of these were urease-positive and proved to be strains of *Proteus,* and many ultimately fermented lactose, sucrose, or salicin. The value of Elek's rapid test for urease is shown by the fact that throughout the work only eight strains giving a negative reaction at three hours subsequently proved to be *Proteus* ; these tests had mostly been made with a small inoculum consisting of a single colony. The analysis of non-lactose-fermenting colonies is set out in the accompanying table, which shows the comparative infrequency of these organisms in pigeons' faeces and the striking prevalence of paracolon bacilli in the faeces of cats as opposed to dogs and pigeons. The paracolon bacilli appearing on the direct desoxycholate-citrate plates from the cats were of a particular biochemical type, differing in colonial appearance and reactions from those appearing after enrichment. They usually grew in profuse and almost pure culture on the direct desoxycholate-citrate plates. On agar they formed round, butyrous, smooth colonies, later developing a more effuse peripheral extension. A distinctive odour was often observed. The organisms were motile.

Table Showing Strains (Excluding Salmonellae) Producing Non-lactose-fermenting Colonies, Derived from the Faeces of Dogs, Cats, and Pigeons

Animal	Organism	No. Positive on Desoxycholate-Citrate Agar			Total Specimens Positive
		Direct	Through Selenite	Through Tetra-thionate	
Dogs (500 specimens)	*Proteus*	36 (7·2)	98 (19·6)	*38 (15·2)	136 (27·2)
	Paracolon bacilli	35 (7·0)	27 (5·4)	6 (2·4)	54 (10·8)
	Ps. pyocyanea	4 (0·8)	2 (0·4)	0 (0·0)	6 (1·2)
Cats (500 specimens)	*Proteus*	22 (4·4)	47 (9·4)	79 (15·8)	105 (21·0)
	Paracolon bacilli	249 (49·8)	127 (25·4)	43 (8·6)	289 (57·8)
	Ps. pyocyanea	0 (0·0)	0 (0·0)	0 (0·0)	0 (0·0)
Pigeons (133 specimens)	*Proteus*	0 (0·0)	11 (8·3)	1 (0·7)	11 (8·3)
	Paracolon bacilli	15 (11·2)	6 (4·5)	0 (0·0)	18 (13·6)
	Ps. pyocyanea	0 (0·0)	0 (0·0)	0 (0·0)	0 (0·0)

The figures in parentheses are percentages.
* The first 252 specimens of canine faeces were not cultured in tetrathionate broth and the percentages are calculated on the last 248 specimens.

They produced acid in 24 hours from glucose, maltose, inositol, and trehalose, and did not ferment mannitol, sucrose, salicin, dulcitol, arabinose, xylose, or rhamnose. Lactose was fermented in about two to six days. Gelatin was not liquefied. The organisms were M.R.+, V.P.±, H_2S−, citrate−, indole+, catalase+.

During the course of the work it was suggested that the indole-positive organisms from the different animals might be examined for possible identity with the type of *Bact. coli* which has been described by Taylor, Powell, and Wright (1949) under the designation D 433. This serological type was isolated in a number of outbreaks of infantile diarrhoea and vomiting, and may play some part in the genesis of the disease. Slide-agglutination tests were therefore made on over 100 indole-positive strains with a D 433 antiserum, but no cultures of this type were identified.

Discussion

In the examination of faeces from 500 dogs, 500 cats, and 133 pigeons, 15 salmonellae of six different types were isolated. The frequency in dogs was 1%, in cats 1.4%, and in pigeons 2.25%. The animals were believed to represent an average sample of the London population of their species, and so far as could be ascertained they were not suffering from disease.

It is of interest to compare these frequencies with those recorded for rats and mice, which are recognized as an important source of salmonellae of food-poisoning types. Savage and White (1923) isolated six salmonellae from the organs of 96 rats, the organism being found in the intestine in three instances (3.1%). Khalil (1938) similarly isolated salmonellae from the intestine of 17 (2.3%) of 750 rats. Welch, Ostrolenk, and Bartram (1941) obtained salmonellae from 1.2% of 420 samples of rat and mouse faeces from widely separated areas of the United States. The percentage in such surveys is likely to be higher when the sample is taken from a small number of localities one of which may harbour an infected colony. All these workers have found a much higher percentage of rodents to be harbouring salmonellae in the spleen and other organs than are excreting the organisms in their faeces. This indicates that infection rates in animals are considerably greater than would appear from cultivation of the faeces, and that the number of infected dogs and cats may in fact be materially higher than the figures obtained in the present survey suggest. The rodent population has less intimate contact with man than dogs or cats, but their numbers and their opportunities of contaminating foodstuffs are of course much greater. The salmonellae most commonly found in rodents are *Salm. typhi-murium* and *Salm. enteritidis*.

Comment may be made on the types of salmonellae isolated in relation particularly to the occurrence of these types in cases of food-poisoning, in dried egg, and in pigs. Information on these points is available in the Medical Research Council's report on "The Bacteriology of Spray-dried Egg, with Particular Reference to Food Poisoning" (Report, 1947a), and in the annual reports of the Chief Medical Officer (Report, 1947b, 1948). The figures show that *Salm. typhi-murium, Salm. newport, Salm. montevideo, Salm. dublin,* and *Salm. anatum* are amongst the species which have been most commonly isolated from cases or outbreaks of food-poisoning in England and Wales, the first-named three occupying respectively the first, third, and sixth places in frequency during the whole period 1923 to 1944. Later reports of the Chief Medical Officer show the continued prevalence of these types. *Salm. anatum* and *Salm. montevideo* did not appear as a cause of food-poisoning in this country until 1941, and there is strong evidence that the infections were derived from imported dried egg. Examination of 840 strains from egg samples revealed 33 different types, and *Salm. montevideo, Salm. anatum, Salm. typhi-murium,* and *Salm. newport* were second, sixth, seventh, and eighth in frequency. Examination of samples of mesenteric lymph nodes from 5,285 pigs showed the same four types in the second, fourth, first, and twelfth place respectively. From 13 samples of sewage sludge (Report, 1947b) *Salm. montevideo* was isolated six times and *Salm. typhi-murium* and *Salm. anatum* three times each.

It is clear that the salmonella types isolated from domestic animals in this survey are among those most commonly responsible for food-poisoning. The strains of *Salm. typhi-murium* were submitted to Vi-phage typing at the Central Enteric Reference Laboratory at Colindale. The strains from the pigeons and one of those from the cats were untypable. The other two cat strains and the two strains from dogs belonged to Vi-phage Types 1, 1a, and 4, which are commonly met with in outbreaks of food-poisoning in man in this country. The provisional typing scheme of *Salm. typhi-murium* now in use has not yet been published (Felix and Callow, personal communication). Of the newer types, *Salm. anatum* usually causes a mild gastro-enteritis and *Salm. montevideo* a more severe illness of the same sort or sometimes a typhoid-like illness in which the organism may be isolated from the blood.

The source of infection of the dogs and cats is a matter for speculation. The most probable origin of the infections in cats with *Salm. typhi-murium* is the eating of rats or mice. Van Dorssen has infected cats by feeding with *Salm. typhi-murium* (van Dorssen, 1937a) and puppies by feeding with *Salm. dublin* (van Dorssen, 1937b). As already noted, *Salm. montevideo* and *Salm. anatum* appear to have been introduced into this country only recently through the medium of dried egg. Although rejected eggs were the probable source of the heavy incidence of salmonella infection in dogs in America reported by Wolff *et al.* (1948), imported dried egg has not been plentiful lately in this country. It is possible that infection might have been derived from pig products, although it must be remembered that these salmonellae were in fact considered to have been introduced into pigs by the medium of dried egg. *Salm. anatum* is known to the veterinarian as the cause of an epidemic intestinal infection of ducklings known as "keel disease."

The isolation of *Salm. paratyphi B* from a cat has not been previously recorded, so far as is known. Edwards,

Bruner, and Moran (1948) have identified strains of this organism from dogs, chickens, cattle, sheep, and swine, and they therefore suggest that domestic animals may act as a reservoir of *Salm. paratyphi B* to be considered in any search for the source of human cases. The strain isolated in the present survey was not typable by the ten Vi-phage preparations that are so far available for the purpose. Such untypable Vi strains, according to the records of the Central Enteric Reference Laboratory and Bureau, represent about 8% of the indigenous strains that have been isolated from persons suffering from paratyphoid B fever in all parts of the British Isles during the period 1941 to 1948. The report of Caspersen (1937) has already been mentioned. There is a record by Krogh-Lund (1940) of the isolation of *Salm. typhi* from the faeces of dogs that had eaten the dejecta of typhoid patients. *Salm. choleraesuis*, an organism closely related to *Salm. paratyphi C*, which usually causes a febrile illness of enteric type, is stated by Bruner and Moran to occur frequently among carnivora, including cats and dogs. These workers, referring to isolations of this organism from human cases, state that "the majority of the infections occurred among children, who are often in close contact with household pets."

The significance of the observations now reported is not easy to interpret. According to the official figures 2,792,863 dog licences were issued in Great Britain in the year 1946–7. If the 500 dogs examined form a fair sample of the whole (an assumption for which there is perhaps no justification), some twenty to thirty thousand dogs would be excreting salmonellae in the streets and open spaces of the country. On the same assumption the number of infected cats is probably very much larger. Cats are, however, less promiscuous in their defaecation habits, and it is likely that the mouse- and rat-catching activities of the cat of the storehouse or the milking-shed outweigh his potentialities for danger. Nevertheless it is clearly an undesirable practice, not devoid of danger, to allow cats to have free access to unprotected foods in provision stores and elsewhere.

The following conclusions seem justified. The percentage of salmonella excreters among dogs and cats is probably of the same order as that among rats and mice. The salmonellae isolated are of species which have caused gastro-enteritis and, in the case of *Salm. paratyphi B*, enteric fever in man. Further, there are a number of instances in the literature in which infection of a person from a dog or cat has been established. It is therefore reasonable that the epidemiologist should consider the possibility that dogs, cats, and pigeons may be a reservoir of salmonella infection from which human cases may occasionally arise.

Summary

In a survey made in London, five of 500 dogs (1%), seven of 500 cats (1.4%), and three of 133 pigeons (2.25%) were found to be excreting salmonellae in their faeces.

The organisms from the dogs were *Salm. newport* (2), *Salm. typhi-murium* (2), and a salmonella of doubtful identity; from the cats, *Salm. typhi-murium* (3), *Salm. anatum* (2), *Salm. montevideo*, and *Salm. paratyphi B*; from the pigeons, *Salm. typhi-murium* (3). These organisms are all types known to be capable of causing disease in man.

This is believed to be the first record of the isolation of *Salm. paratyphi B* from a cat. The organism was a Vi strain not typable by Vi-phages.

The significance of the findings is discussed. It is suggested that dogs, cats, and pigeons are worthy of consideration as possible sources of salmonella infection in man.

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The work of the Water Pollution Research Laboratory during 1948 is described in a report published for the Department of Scientific and Industrial Research by H.M. Stationery Office (price 1s. 3d., by post 1s. 5d.). Of the new investigations referred to probably the most interesting is one to be undertaken for the Port of London Authority, to examine the causes of silting in the Thames Estuary. The Port of London Authority has provided a laboratory at Tilbury and a launch specially fitted for survey work which will include investigation of the degree of pollution of the estuary water, the character of the bottom deposits, the quantity, nature, and origin of the material carried in suspension during the run of the tide, and the effect of polluting substances on the physical and chemical properties of this material. Reference is also made to the "cleansing stations" in which mussels taken from polluted coastal waters are cleansed of bacteria before being sold to the public. Work has also continued on the control of the small flies which in warm weather emerge from the percolating filters used in the treatment of sewage. Investigations are described of waste waters from the washing of wheat and the steeping of barley and of the treatment of effluents from the manufacture of cider and the pickling of steel. The most detailed work, however, was on the treatment of waste waters from electroplating plants and particularly of those containing cyanides. Discharge of waste waters of this kind is often responsible for the death of fish in rivers.