The Rat and its Repression.

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RATS have for more than three thousand years been regarded as noxious vermin by man. Boelter¹ reminds us that the Egyptian cat, *F. Caffra* (*Caligata* or *Maniculata*) was a domestic animal in Egypt twenty centuries B.C. and that it was held in the highest reverence as a natural protector of grain from rats and mice. Boelter relates how, when Ptolemy was doing all he could to conciliate the Roman power, a Roman accidentally killed a cat, and Diodorus Siculus, an eye-witness, tells how nothing, not even the terror of the Roman name, could save the unlucky Roman from punishment. To-day, when the rat army numbers almost countless legions, we find an apathy that is appalling, a stagnation of effort which is allowing the rat to encircle the earth, and like a creeping paralysis to leave death and destruction in its trail.

It is not so important to fix geographically or historically the origin of the rat, as it is to realise the fact that this rodent now inhabits practically every place where man has a dwelling, and that of all animals it is most fitted by nature to serve as a human scourge. Apart from the astonishing prolificacy of the rat, the animal is furnished by nature with first-class engineering and excavating tools in the shape of wonderful hand-like paws, a pair of incisor teeth of razor-like cutting power and hardness, a tail which serves a variety of uses, and a brain nimble, cunning, and educable. These advantages plus a courageous and adaptable disposition have served to make the rat ubiquitous.

It has been urged that all rats are cannibals and that the brown rat (*Rattus Norvegicus*) in England has driven out the black rat (*Rattus Rattus*), but too much reliance cannot be placed on these assumptions, for rats are cannibals only when driven by unsatisfied appetite, and it is doubtful if the number of black rats in any area in England is such as to diminish the food supply of the brown rat and force it to become an active cannibal, or, on the other hand, that the sexual appetite artificially stimulated under the Rodier system can diminish appreciably the number of rat hordes.

It is, of course, fairly easy to invite a charge of exaggeration when dealing with the rat, for the pest is without doubt a grave menace; it has been said by Dr. Khunart that the rat must be destroyed, or it will destroy man. Insistence on the serious character of the problem makes it extremely difficult, however, to wage an effective war on the animal; for it is easy to secure the label "crank" and to lead the man-in-the-street to remark that, if it be true that the rat is such a terrible fellow, "it's a wonder we are alive." Prominent leaders of thought in the veterinary world regard the rat as a disease carrier *par excellence*, and I am convinced that further research will establish the rightness of many suspicions, but for the moment let us consider the nature of proven charges. We know, for example, that rats transmit plague, trichinosis, malignant jaundice, parasitic mange, and rat-bite fever, and we know that these maladies are serious diseases. They are, of course, calculable in effect, but there are other human ills directly attributable to the presence of the rat, such as loss of sleep through nervousness,

fright, etc., and these ills are burdensome in so far as that they contribute materially to the sum of factors in physiological fatigue and therefore occasion incalculable loss of human efficiency.

Economically, the rat is a charge upon the resources of the nation, which is only measurable in figures too great to be comprehended by the casual student. We know that rats commence to breed when three months old, that the female litters from 6 to 12 times a year, and that the litter consists of from 6 to 12 young; therefore, we have a population of about 1000 rats from one pair of rats in 15 months, and as a rat costs approximately 1½d. per day for food it will readily be seen that we are paying too dearly for this pest. How much we are paying will be more clearly realised when we remember that it is generally agreed that the number of rats equals the human population; in some cases the rat population is considerably greater, as at a sugar plantation in Porto Rico, where the population numbered less than five hundred people and a six months' rat drive accounted for 25,000 rodents killed. Bearing these numbers in mind, and taking the population of the British Isles as being about 47,000,000, we get a rat cost of as much as 75,000,000l. per annum after deducting ½d. per day per rat for garbage eating.

This is not, however, the total amount of taxation the rat imposes upon us, for it is my experience that the animal does an enormous amount of damage in pursuit of its food, and in poultry yards its depredations are very considerable. "Lantz (U.S.A.) quotes a Washington merchant to the effect that rats gnawed a hole in a tub containing 100 dozen eggs, and within a period of two weeks carried away 71 dozen without leaving either shell or stain." Cases are not rare where rats have disposed of half a lamb in a night, and it is an undoubted fact that if meat is condemned as tuberculous or unfit for food, rats seem to have an uncanny instinct for finding and consuming such portions of the carcasses as are diseased.

It must not for one moment be imagined that fear of the rat is a fad, nor is it peculiar to the medical profession: medicine, hygiene, and commerce all have contributed men with international reputations—Crichton-Browne, Andrew Balfour, Arthur Shipley, Glen Liston, Mark Hovell, Akin, Pasteur, Creel, Emil Zuschlag, Hinton, Bruce Bruce-Porter, James Cantlie, Frederick Hobday, Banister Fletcher, Castellani, Nathan Raw, Sydney Hickson, Tanner Hewlett, and Lords Denbigh, Aberconway, Lambourne, Ernle, and others too numerous to mention have joined their voices to those of the informed public and members of Parliament in a call for rat repression, as a measure of public safety.

It is significant that the first determined effort to deal with the rat in England found definite shape in ordinances made in various parishes in 1740 and again in a Bill introduced into the House of Commons by Sir Chas. B. McLaren in March 1909, and reintroduced by him into the House of Lords, some ten years later, where he sat as Lord Aberconway. Although in common with America, Japan, Denmark, Sweden, Barbadoes, Antigua, and Hong Kong, we in England have now an anti-rat law, there is much amendment required to make it effective.

¹ "The Rat Problem," by Wm. Boelter. John Bale, Sons, and Danielsson, Ltd.

There are no financial provisions for the Rats Act's working to be found in the Act; it is punishable with a fine to harbour rats, yet reinfestation of a cleared habitation is not punishable, nor is trafficking in rats a crime. These weaknesses are being remedied in a Bill being drafted by the Incorporated Vermin Repression Society to amend the existing Act. The I.V.R.S. memorialised the League of Nations, and incidentally the memorial was signed by leaders of all shades of thought, with the view of securing an International Conference to deal with rats and shipping (the existing regulations being chaotic and tending to discriminate against this country) and to give a ruling on the vexed question of the employment of virus.

The virus question is one that should be settled without delay. Those—like the I.V.R.S.—who oppose its use, argue that it is unsound in principle to permit the unrestricted use of living virus, or germs, of mouse typhoid or any other disease which might possibly become communicable to man, and that, moreover, it is a waste of money and opportunity to create a race of rats immune to the effects of virus in the process of killing what is, after all, an infinitesimal proportion of the rat population. Attempts to get manufacturers interested in the production of virus to agree to a round table conference with unbiased bacteriologists, pathologists, Government representatives and business men, have unfortunately, so far, been unsuccessful.

The question is often asked—"What is the best method of destroying rats?" There is only one answer—"There is no *best* method of destroying these pests." Rat destruction is a problem of urgency, and also one of extreme difficulty, and a moment's reflection shows that this difficulty cannot be dismissed with a shrug of the shoulders, because the rat is far too clever to be caught except in negligible numbers by any crude method. It is an omnivorous feeder, and since the rat's diet comprehends bacon, bananas, eggs, lamb, young chicks, offal, bread, sponge-cakes, young rabbits, young game, biscuits, human flesh, apples, sweetbreads, corn, bulbs, and other eatables too numerous to mention, it is hopeless to pin one's faith to poisoning, since all poisoning, that is to say, effective poisoning, is a matter of baits. Again, this method of destroying rats demands fool-proof preparations, which limits the field in this respect; obviously it is dangerous to place poisons such as arsenic, strychnine, antimony, phosphorus and the like in places accessible to children or domestic animals; therefore, for all practical general purposes we are limited to barium carbonate, squill, and sodium fluoride. Cats and dogs are very useful, but it is a mistake to assume, as does one port authority, that an excellent sufficiency of cats is a good insurance against rats; as a matter of experience it is nothing of the kind, for, like practically all domesticated animals, the cat is companionable, and unless it has a spare diet, and is deprived of the association of too many of its kind, it becomes a hunter after the fleshpots of Egypt rather than a menace to rats. Ferrets are useful only in the hands of practical rat-catchers; for in unskilled hands they get lost. Nevertheless, since they are useful in skilled hands, they may render excellent service to the community when they are associated with a game terrier in an anti-rat club, and such clubs should be a feature in every village and rural town. Gassing, too, has its advantages, sulphur dioxide being perhaps the safest to use, but as a lethal agent it is inferior to chlorpicrin gas. The U.S.A. Government report favourably on a gas called cyanogen-bromide. There is much to be

said for the raising of the status of those who are engaged in the war against rats; for modern drainage systems, while aiming at efficient sanitation, undoubtedly provide excellent facilities for rat locomotion, and tend to defeat the object of rat-weeks by allowing the hard-pressed rats of one district to escape to another district where the rat-week is next week. The vast emporiums, too, provide problems in rat repression which no ordinary rat-catcher can grapple with effectively. To sum up, if rats are to be appreciably diminished in number it is imperative that—

(1) An International Commission be created to extract the best of all existing rat laws and codify them in such a manner as to ensure their being concurrently effective in all countries, and in all ships and vehicles of water transport.

(2) Our own rat laws be amended: (a) to make rat trafficking a crime; (b) to make rat reinfestation a crime; (c) to make financial provision for the carrying out effectively of the rat law; and (d) to make it an obligation upon the Ministry charged with the administration of the Act to enforce its being carried out by the authority concerned.

(3) All *bona fide* rat-catchers be registered and given instruction in elementary pathology, sanitary engineering and hygiene, and certificates be issued to competent and honest persons engaged in this business, withdrawable publicly in the Press in the event of petty larceny, offences against the Rats Act, or for other specified reasons.

(4) The question of the use of virus should be settled, and whatever conclusion is arrived at in this regard be given the widest publicity.

(5) Twice a year all British authorities be compelled to co-operate and synchronise their efforts in rat destruction, and during the period, public lectures on rat destruction, rat proofing, and the necessity for eliminating possible rat-breeding grounds, be organised by the authorities.

(6) The authorities responsible for the zoological laboratories of all universities, colleges, and institutes be invited to set apart a portion of their time for the teaching of economic biology in so far as it concerns the rat, the diseases it carries, its movements, the nature and extent of its depredations, its natural enemies, and the known poisons which are safe to use, this with the view of discovering improved methods of ensuring its destruction.

(7) In all elementary schools pupils be taught the life-history of the rat, regarding the rat as man's natural enemy, the toxicity of the various raticides in common use, the value of the barn owl (*Strix Flammea*), the ferret, the weasel, the common kestrel, and the pine marten, the use of baits, varnishes, traps, the progress made by gassing as a method of rat destruction in ships and in places where it is possible to confine the gas, and the best methods of destroying rats (by water-flooding) in their runs, an effective method of killing rats in the country.

(8) All local authorities should frame their bye-laws so as to encourage rat proofing, and all employers of labour should exhibit in canteens, etc., a card, 12 in. x 10 in., warning their employees against leaving about the debris of food, and a reminder: "NO SCRAPS, NO RATS."

It cannot be urged too strongly that of all remedial measures against the rat, the most important are rat proofing and the withholding of food and water, especially water, for rats can exist much longer without food than without water.