

TRYPANOSOMIASIS : THE NEED TO MODIFY THE APPROACH TO THE CONTROL OF NAGANA IN THE FACE OF CHANGED POLITICAL AND SECURITY SITUATIONS.

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INTRODUCTION :

Trypanosomiasis is an infectious disease but with certain peculiarities which make it unique and unusually sensitive to the prevailing political climate. Its control is complicated by certain properties possessed by the parasite which call for extreme exactitude in its chemotherapy, particularly in areas of high trypanosome risk where prophylaxis is necessary.

Davey has said that there is no parallel in veterinary medicine for the certainty of death where cattle, tsetse and wild game exist in proximity. It can be taken that in Rhodesia trypanosomiasis is transmitted by tsetse flies and by this means alone and so any consideration of the disease must take in the vector. Chemotherapy can only be regarded as a stop-gap, and interim measure which can maintain the health of cattle until such time as the vector is eliminated. The trypanosome, the causal parasite of nagana, particularly *T. congolense* the chief parasite of cattle, is noteworthy amongst other things for its extreme lability. It possesses a remarkable facility for change, antigenic change which renders it resistant to the host's antibody and its ability to develop drug resistance. In brief it is capable of altering its sensitivity to hazardous substances or detrimental material introduced into its milieu to such an extent that it becomes insusceptible. This defensive attribute is responsible for the two main constraints in the veterinary control of the disease, the lack of a vaccine and the frequent appearance of drug fast strains of trypanosomes. The first of these factors poses a serological problem of great complexity which is unlikely to be solved in the immediate future and so must be accepted as a fact. It need not be considered further in this paper which is concerned with control measures presently feasible and applicable in the near future.

Chemotherapy. There is no doubt at all that chemotherapy and particularly chemoprophylaxis has been exploited to a greater extent and more efficiently in Rhodesia than elsewhere in Africa south of the Sahara. At least two experts, Whiteside and Beveridge, told me that our attempts to maintain cattle in zones of the highest density tsetse challenge were unlikely to succeed and that the wholesale development of drug fast strains under such conditions was inevitable in a short period of time. Our methods have achieved their aim however because of insistence upon observing Whiteside's rules of prophylaxis. These are the sine quo non of successful prevention and since their strict observance is responsible for our unquestionable successes over the last 20 years and the possibility of their non-observance in the face of a changing political situation is a major stumbling block to their continued success, they are recalled.

- 1) Chemoprophylaxis is never considered unless it is absolutely necessary, i.e. the challenge is such as to demand it.
- 2) Once adopted, a prophylactic regime is never varied without good reason, i.e. the dosage rate and period between inoculations are not changed lightly.
- 3) Every attempt is made to assure 100% production of the infected herds at the intervals stated.
- 4) A prophylactic regime is never abandoned without the precaution by way of sanative measures during the period after the final treatment.

It must constantly be borne in mind that primary drug resistance in trypanosomes is always post adaptive and invariably attendant upon exposure to a sub-lethal level of the drug concerned. This is the crux of the whole matter of therapeutics and our inimitable success in maintaining cattle has been due to insistence upon the highest standards of technique and enforced good production over long periods. Our achievements are best illustrated by a consideration of the cattle numbers in two areas, the Lubu Valley in Binga district and North Gokwe. In the former area, in 1957, 300 head of cattle were moved away from the Zambesi River to Siansali's area to avoid the rising waters of Lake Kariba. This was to an area of heavy challenge requiring continual chemoprophylaxis and yet by 1975, in 18 years, there were 4 000 head the increase being natural. In Chief Nwangwe's area over the same period of time the numbers increased from 100 to 8 100.

Tsetse Control. Until about 1959 the control of Glossina has been mainly vested in game elimination. For some time prior to that date there had been increased public resistance to what, it must be admitted, was a distasteful and wasteful but nevertheless very successful method. Between 1933 and 1945 25 000 km² of the country were freed by this method. The classical error of abandoning a successful method in the absence of a proven substitute resulted in a major advance of the fly on all fronts. The Second Review of the Tsetse and Trypanosomiasis Position in Rhodesia (Cockbill 1964) warned the government and was followed by an aggressive anti-tsetse policy based upon the then new method of the ground selective spraying of persistent insecticide combined with the less wasteful method of the selective elimination of the six favoured food hosts of Glossina. This stabilised the position rapidly and by 1972 things were vastly improved on all sectors. The final expulsion of tsetse from Rhodesia no longer appeared unattainable, indeed in the extreme south-east a combined operation in conjunction with the Mocambique and South African authorities had resulted in the clearance of tsetse from Rhodesia and the lifting of a threat to the Kruger National Park and the intensive Portuguese settlements on the Limpopo. The number of cattle under prophylactic cover dropped from 103 000 to 37 000 and it appeared that before long all the cattle raising areas would be freed from tsetse and the Branch would be working in the sparsely populated and cattle free hinterland, always a much easier task.

The effect of the security deterioration. The rapid escalation of the war from 1972 has led to a steadily decreasing ability by the Branch to carry out tsetse control measures as a result of which there has been spectacular advances of the vector in many areas, with a concomitant massive increase in the incidence of cattle trypanosomiasis. Additionally, the Veterinary Field Branch in the respective provinces has been severely restricted in applying chemotherapeutic measures. The inevitable decimation of cattle has accompanied this regrettable state of affairs. An idea of the seriousness of the position can be gained by an examination of the available figures in the north-east, in Darwin and Rushinga districts where the tsetse pushed back to the frontier by 1972 have encroached throughout Chiswiti and Chimanda Masoso TTL's and are now known to have crossed the Mazoe River southwards into Mtoko and Mrewa districts. On this front despite repeated attempts to treat the cattle, all foiled by the terrorists, it is estimated that more than 12 000 head have died and at least seven centres ceased to exist. The position is worse than it has been during this century in this zone. In Binga and the Lubu Valley things are equally desperate.

In the face of such situations there is virtually nothing that the department can do until such time as the risk of terrorist action is removed or falls away. With our peculiar need for continuity and scattered nature of the specific anti-tsetse measures, under the present conditions there is no possibility of acceptable armed protection and even the minor tsetse control measures proposed in a few areas for this season are subject to local changes in the security situation. With the necessity for the prior notification and call up of cattle we cannot hope to function in such areas where

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already too many valuable lives have been tragically lost in vain attempts to protect the tribal herds.

The maintenance of game and cattle fences of which the Branch was responsible for 600 km and 900 km, respectively, presents another problem again under the present conditions apparently insurmountable. Wire and even standards are being stolen in a wholesale manner and as far as I know not one conviction has been obtained. In certain districts we have for years restricted the ingress of cattle because their presence would have seriously embarrassed control procedure. These restrictions are no longer possible, at least in a meaningful manner because of the impossibility of policing such areas.

THE FUTURE:

It is clear that future policy, whether specifically anti-tsetse or aimed directly at controlling the disease in livestock until an anti-tsetse campaign can be mounted, will depend upon the security and so the political situation. There appear to be two possibilities:

- 1) the absence of a meaningful political settlement and so a continuation of the war;
- 2) the supervision of political agreement, the cessation of hostilities and a resumption of tsetse and trypanosomiasis control activities albeit on a modified basis. (See below).

1) If the present position persists, clearly the fly will steadily advance, ultimately reaching approximately the 1050 m contour its ecological limit in Rhodesia. This is to say about 50% of Rhodesia would be overrun and in the process $\frac{1}{2}$ of the national herd.

2) In the event of a meaningful settlement presumably work would be resumed, the time lag determining the extent of the encroachment and so the requirements for trained staff, equipment and the necessary funds. There will inevitably be a hiatus before a nation-wide anti-tsetse campaign could be mounted and gain momentum. The exact extent of the incursion would have to be determined as we have been unable to maintain our network of surveys on all fronts, and priorities decided. In the interim the veterinary organisation would be called upon to attempt by chemotherapy the protection of large numbers of cattle, an operation regrettably not based upon so firm a foundation as previously. Freedom of choice will be the popular order of the day and suggestions of coercion will at least at first be frowned upon because unpopular as such measures inevitably are, they might be turned to good account by unscrupulous oppositionists.

In the past the considerable success we have enjoyed in controlling trypanosomiasis and its vector has been due in no small degree to our ability to enforce the appropriate regulations framed specifically for those purposes but often unpopular and seldom completely understood.

It is now suggested that this will, at least at first, no longer be possible and some compromise solution must be sought without delay. In the past there have been instances where the stock owners have been allowed to refuse treatment in the belief that the ensuing deaths would convince the owners of the correctness of the official policy. In nearly every case this has proved a singularly potent weapon and it promises to be even more important in the future.

With the object of facilitating anti-tsetse operations we have at various points in time established lines or boundaries beyond which no livestock has been permitted. Since these have been drawn of necessity, as tsetse advances

have become apparent and as we have never (with one exception) seriously considered destocking, in many cases salients have been established to later suggest discrimination to would-be stock owners and inexperienced administrators alike. These apparent anomalies are likely to assume considerable significance in the near future and tax the imagination and political dexterity of our future masters. Many of the restrictions cannot be enforced now and should be removed without delay with due warning to the stock owners of likely consequences.

In the introduction above, the lability of the trypanosome and its facility for becoming drug resistant has been explained. This fact has been the main difficulty in maintaining cattle in high challenge by repeated prophylaxis. We have, as stated, enjoyed successes in this field greater than elsewhere in Africa because of our organisation and ability to ensure continuity. Even in our case however one prophylactic compound after another has failed and we have only one remaining - iso-metamidium (Samorin). It is therefore of great importance that we use this compound in the months to come with the utmost circumspection. As outlined, the demand for it will be great, perhaps greater than we can conveniently dispense, but we must try by every means to keep the control of this drug in our own hands. It will be necessary to seek the aid of every publicity device existing to impress upon the cattle owners the importance of continuity and good production of stock and to convince the politicians of the need for discipline.

Tsetse Control. Briefly, for a detailed consideration of this matter is not within the scope of this paper, we shall, when control operations are resumed, be inevitably (see above) working in areas where cattle can fulfil the food requirements of the fly and the destruction of the favoured hosts will have no effect. The use of insecticide by selective ground spraying in the dry season is likely to be the main weapon again until such time as aerial spraying replaces it with the availability of sophisticated navigational aids and the adaptation of the method for the more broken country.