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A NOTE ON THE FAUNA OF THE LOWER ORANGE RIVER

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ABSTRACT

The faunal analyses of a few snap biological samples from the lower Orange Rver are presented. These are discussed in the light of previous hydrobiological surveys on other South African catchments and of the future development of the Orange. The need for a great deal more information is emphasized.

SAMPLING

During December 1960 a few snap hydrobiological samples were collected from the Vaal-Hartz and Orange rivers on a visit to the northern Cape Province. Collections were made at ten different points, but the results described here come from only four of these stations (see Fig. 1) as it was only at these points that fairly representative samples could be collected.

Aquatic samples were collected according to standard procedure using a net with mesh opening of 0.288 mm; these were formalinized in the field and later processed in the laboratory for analysis under a stereo microscope. Unfortunately it was not possible to collect water samples for mineral analysis except for one small sample from Station 3 which gave the following result:

pH	8.65	
Total dissolved solids	135	mg/l
Total hardness	65	mg/l (as mg/l $CaCO_3$)
Total alkalinity	31	mg/l (as mg/l $CaCO_3$)

A brief description of the sampling stations as indicated in Fig. 1 is as follows:

STATION 1: Vaal-Hartz River at Schmidtsdrif. Altitude ca 1100m (3600 feet). Current very slow. Sample from submerged grasses and weeds.

STATION 2: Orange River at Prieska. Altitude ca 915 m (3000 feet). Samples from marginal vegetation in fast current, and from small stones, also in fast current, in a shallow part of the river. Fauna of both habitats dense.

STATION 3: Orange River at Upington. Altitude ca 800 m (2600 feet). Sample from marginal vegetation in very shallow water with slow current. Fauna poor, possibly due to recent inundation of vegetation.

STATION 4: Orange River at Onseepkans. Altitude ca 290 m (950 feet). Sample from marginal reeds and willows in slow current. Water very turbid. Fauna poor.

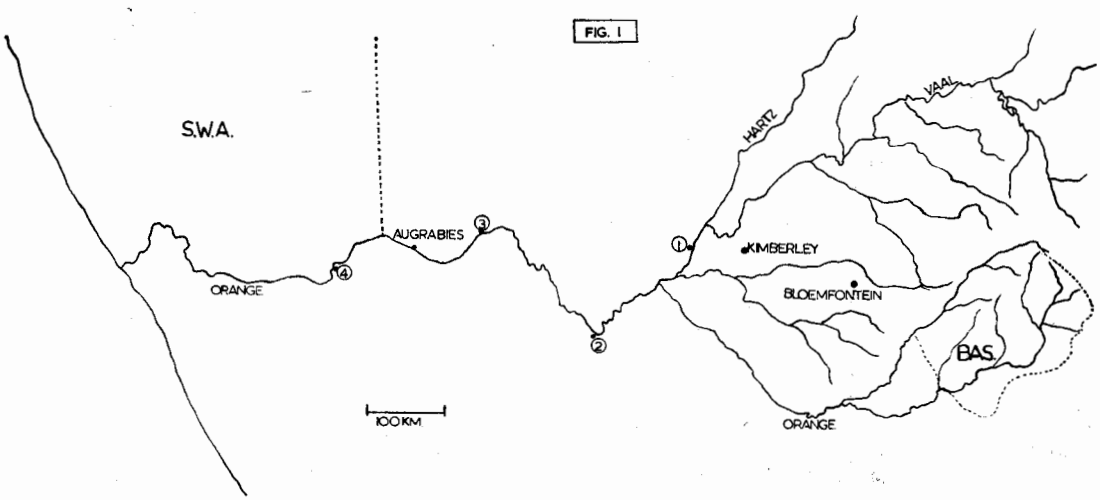

Figure 1

RESULTS

The results of the faunal analyses are presented in Table I (fauna of stones) and Table II (fauna of vegetation). In calculating the percentage composition the presence of entomostracans and fish in the samples was ignored. Furthermore, the faunal density has not been expressed numerically as no efforts were made during sampling to take quantitative samples.

Table I: The Orange River at Station 2. Percentage composition of the fauna of shallow stones on a sandy bottom.

		%
OLIGOCHAETA	?Tubificidae	p
EPHEMEROPTERA	*Baetis quintus*	8·5
	Caenidae	p
	Centroptiloides bifasciata	1·0
	Euthraulus elegans	p
	Tricorythus cf *discolor*	1·1
HEMIPTERA	*Aphelocheirus schoutedeni*	1·2
TRICHOPTERA	*Cheumatopsyche thomasseti*	2·4
	Hydropsyche sp.	2·0
COLEOPTERA	Dytiscid larvae	p
	Aulonogyrus larvae	p
	Elmid larvae	p
DIPTERA	*Simulium larvae*	81·1
	Simulium gariepensis pupae	1·0
	Chironomid + ceratopogonid larvae	1·0
	total	99·3

N.B. p=present in small numbers

Referring to Table I, it will be seen that the composition of the fauna is dominated by *Simulium* larvae, which are probably all *Simulium gariepensis* as ten pupae of this species were found in the sample and none of any other *Simulium* species. Apparently *S. gariepensis* is endemic to the Orange as it has not been found in the southern and western Cape (Harrison[1], Harrison and Agnew[2]), Natal (Oliff[3]), southern Transvaal (Chutter[4]) and northern and eastern Transvaal (Agnew[5]). A number of ephemeropteran species are present, all of which are widespread in southern Africa with the exception of *Baetis quintus* which has been recorded once elsewhere ,in the headwaters of the Vaal (Agnew)[6]. It is likely that these two species are confined to the Orange system. *Centroptiloides bifasciata*, a unique carnivorous baetid that feeds on *Simulium* larvae, has been classified by Harrison and Agnew[2] as a "temperate species preferring alkaline water" and its presence in the sample is therefore in accordance with their classification. During winter months this species occurs at lower altitudes but it is normally confined to "highveld" during the summer.

The fauna of vegetation (Table II) is variable and this due mainly to sensitivity to current speeds which varied considerably, from very slow to fast. The fauna here is much less distinctive, apart from the occurrence of *S. gariepensis* discussed above. The great majority, if not all, of the species are also to be found elsewhere e.g. in the southern Transvaal. Nevertheless one is struck by the paucity of certain groups e.g. certain trichopterans (of which only a few specimens were present and are not shown in the Table) and Molluscs. The reason for this is obscure but it is doubtless connected in some way with the as yet uninvestigated pecularities of the Orange.

INTERPRETATION

A cursory comparison of the fauna herein described from the low Orange with that described by Oliff[3] from the Tugela River, which lies at comparable altitudes and latitude on the east coast brings to light further points which will have to be investigated more systematically. For example the lithophilic fauna from the Tugela contains ephemeropteran species such as *Pseudocloeon maculosum* and *Baetis harrisoni* and the genera *Elassoneuria*, *Afronurus* and *Prosopistoma* which are apparently missing ftom the Orange; the same may be said of *Notonurus* from the vegetation fauna. This could conceivably be due to the almost total inadequacy of information conveyed by a few random samples such as those described here. Nevertheless it is felt that there are sufficient grounds for believing that there are distinctive features in the fauna of the Orange which merit further investigation on a larger scale. Some differences may prove to be linked with the high turbidity and silt loads of the Orange or the temperature regime of the river.

THE DEVELOPMENT OF THE ORANGE

It is hardly necessary to point out that the proposed development scheme for the Orange which will involve the construction of a number of large dams will bring about profound changes to considerable stretches of the river. With this development will go increases

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Table II: Percentage Composition of the Vegetation Fauna at Stations 1 to 4.

		Stations	1	2	3	4
			%	%	%	%
NEMERTEA	*Prostoma*		p	—	—	12·0
OLIGOCHAETA	Naididae		5·8	—	—	—
DECAPODA	*Caridina nilotica*		4·8	—	—	—
HYDRACHNELLAE	(Unidentified)		21·8	p	—	—
EPHEMEROPTERA	*Baetis bellus*		1·6	—	5·9	8·0
	Baetis latus		—	6·0	6·0	7·9
	Centroptilum excisum		—	—	17·9	—
	Cloeon sp.		p	—	—	—
	Pseudocloeon vinosum		—	—	—	8·0
	Baetid juveniles (unidentifiable)		p	4·7	16·0	12·0
	Caenidae		—	—	2·0	p
ODONATA	*Pseudagrion massaicum*		1·0	—	—	—
	Pseudagrion vaalense		—	p	—	—
NOTONECTIDAE	*Anisops* sp.		8·5	—	—	—
	Nychia marshalli		21·8	—	—	—
CORIXIDAE	*Micronecta* juveniles		14·4	—	2·0	—
BELOSTOMATIDAE	*Sphraerodema capensis*		p	—	—	—
NEPIDAE	*Ranatra parvipes vicina*		2·6	—	—	—
DYTISCIDAE	*Neptosternus alluaudi*		—	—	—	7·0
SIMULIIDAE	*Simulium* larvae		—	86·3	p	—
	Simulium bovis pupae		—	p	4·0	—
	Simulium gariepensis pupae		—	p	—	—
DIPTERA	Chironomid + ceratopogonid larvae		9·0	1·0	18·0	8·2
MOLLUSCA	Ancylidae		3·2	—	—	—
	Gyraulus costulatus		—	—	—	4·0
		total	94·5	98·0	71·8	67·1

N.B. p=present in small numbers.

in population and heavy demands for water, for domestic, agricultural and ultimately industrial uses. Inevitably the problem of disposal of the different wastes peculiar to these uses will arise. It is therefore imperative that an early documentation of the biological and physico-chemical aspects of the Orange be undertaken to establish the relatively undisturbed ecological pattern at present prevailing. Not only will problems of pollution and self-purification arise but also the possibility of "foreign" organisms being introduced either accidentally or on purpose must be borne in mind. Here one automatically thinks of undesirable weeds (? *Salvinia* or) the mollusc vectors of human schistosomiasis, but undoubtedly beneficial species such as edible or sporting fish might also be introduced for aesthetic or recreational value or to be integrated into a fish production scheme.

The points briefly mentioned above will, it is hoped, help delineate some of the scientific aspects which will need further study if the fullest benefit is to be gained from the Orange, both now and as development proceeds.

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