The occurrence of living organisms in the artesian waters of Australia is, when the subject is regarded from an a priori standpoint, a matter of high probability. Numerous organisms, many of them by no means of the lowest grade, have been found to flourish in water of springs the temperature of which is much higher than that of the water issuing from most of the artesian bores. In hot springs in Italy it has been found that life of various kinds is fairly abundant, even when the temperature of the water approaches 40° C. Nor is there anything in the nature or amount of the mineral salts in solution in the water that would interfere with such a development. Moreover, in Texas, and in Algeria a variety of animal organisms—molluscs, crustaceans, fishes, and amphibians—have actually been obtained in the water issuing from bores tapping artesian basins.

The animals that have been found hitherto in artesian waters have in a good many cases proved distinct from any of the forms occurring in the surface waters; so that something more is involved than the mere chance passage of a larval fish or river-crab through crevices into the subterranean reservoirs of the artesian basin: there must be a

2 Les Forages Artésiens de la Province de Constantine (Algérie). Résumé des travaux exécutés de 1856 à 1889. Par M. Jus. Constantine, 1890. I am indebted to the courtesy of Mr. J. W. Boulthbee for the opportunity of consulting this report.
fauna existing there permanently: a fauna doubtless introduced originally in a fortuitous manner from the surface waters; but now established permanently underground, a fauna differing in a sensible degree from that which now inhabits the surface waters. It is this last consideration which lends its main interest to an investigation of this subterranean aquatic fauna in Australia. While the freshwater animals inhabiting the rivers and lakes of the surface have been subject at intervals to wholesale destruction owing to the complete desiccation of rivers and lakes in time of drought, the subterranean fauna may be supposed to have been protected from this destructive influence; and it is not too much to hope that forms no longer represented in the surface fauna may survive in the artesian underground reservoirs.

When I first began some inquiries into this subject a few years ago, I found that there were rumours in abundance of animals—fishes for the most part—having been discharged from the bores; but there was apparently an absence of trustworthy evidence that they had actually passed out in the artesian water. It is well known that when new dams are formed, even at a considerable distance from other water, a population of crayfishes, water-snails, and mussels, water-beetles and other aquatic insects, and frogs and fishes, appears in it with what seems remarkable rapidity: and such a development, in the case of the new dams and tanks filled with the artesian water, might lead to the erroneous conclusion that the animals in question had actually issued forth in the stream from the subterranean reservoirs. To prove that any animal is in reality a member of the artesian fauna, it must not be merely picked up in the neighbourhood of the bore, but must be actually caught in the act of issuing forth from it. For the purpose of collecting such artesian animals
a strong close net, so arranged as to catch a portion of the column of water as it descends, is all that is necessary. Probably the most suitable and convenient thing for the purpose would be a sieve of fine mesh, say 20 to the inch. Everything caught in this should be put as soon as possible in a suitable preservative. The best and most convenient preserving fluid for use in this way is either a weak solution of formalin (2%) or sublimate alcohol (a solution of corrosive sublimate in 50% alcohol).

For the collection of smaller and more delicate objects, a plankton net of the kind used for the collection of small marine and fresh-water surface organisms will be necessary. The form of plankton net which I have been using of late—one described by Charles A. Kofoid¹—is well adapted to this special purpose. It is constructed of Swiss silk bolting-cloth, and has a detachable copper bucket; but the latter is not absolutely necessary, and a deep conical net of the material mentioned, or of fine Indian muslin, will serve the purpose sufficiently well.

As it would be inconvenient or impossible to suspend a net of this kind under the heavy falling column of water, a sheet of galvanized iron should be so arranged as to form a "catchment area" for the net. The sheet should be folded longitudinally in such a way that the two halves meet at an open angle. It should be supported in such a position that one end of it should be below a portion of the falling water, while below the other end serving as an outlet is suspended the net, the slope of the sheet of iron being such that anything contained in the water will be swept down into the net.

By the kindness of Mr. J. W. Boulthbee I was enabled in 1900 to get some trials made by means of such a plankton net of the water of the Tenandra bore near Warren. These

were merely preliminary trials; and, though the results were meagre, they afford no grounds for the conclusion that an artesian fauna does not exist. On the contrary, the capture of the larva of an aquatic insect affords positive evidence that animal life does exist in the artesian water; and the scantiness of the results of this particular experiment may have been due to some special local conditions, or to some defect in the manner in which the work was carried out.

THE CHEMICAL NATURE OR THE SOILS OF NEW SOUTH WALES WITH SPECIAL REFERENCE TO IRRIGATION.

By F. B. Guthrie, F.I.C., F.C.S.

[Read before the Engineering Section of the Royal Society of N. S. Wales, First Session July 20, 1903.]

There is one aspect of the problem of water-conservation and irrigation which has not received the attention to which it is entitled, namely, the question of the nature and constitution of the soils which it is proposed to irrigate, and of the water which is to be used for the purpose. When speaking of the constitution of the soil I do not refer to its chemical composition alone. This though an important factor is by no means the only one which has to be taken into consideration.

The texture of the soil, its mechanical condition, the proportions of clay, sand and humus, its power of absorbing and of retaining water and salts, its power of resisting undue evaporation from the surface, and too rapid loss of water by percolation into the subsoil, its capillary and

View This Item Online: https://www.biodiversitylibrary.org/item/130744
DOI: https://doi.org/10.5962/p.359428
Permalink: https://www.biodiversitylibrary.org/partpdf/359428

**Holding Institution**
Smithsonian Libraries

**Sponsored by**
Biodiversity Heritage Library

**Copyright & Reuse**
Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the Biodiversity Heritage Library, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at https://www.biodiversitylibrary.org.