

From the physical features of the country, and the condition of the mineral, it is evident that the tinstone has been derived from the adjoining slopes, which are composed of a sub-metamorphic micaceous sandstone. These stream deposits are of comparative small importance in comparison to the supply to be derived from stanniferous lodes, but they will doubtless afford employment to a number of the poorer miners for some time to come. The formation most abundant in tin veins is the granite, but in neither of the two deposits of tinstone did I find evidence of such an association, nor is it definitely known if stream-tin has been found in the *débris* from the known granitic masses.

#### COPPER.

The existence of ores of this metal in the Northern Territory is beyond dispute. The sites of the discoveries are shown by blue colour on the mineral map; these are a little south from Pine Creek, in Cruikshank's Gully, and at another point near the Howley Battery. The prospects are, in each case, in the highest degree encouraging; but, apart from the question as to the quality of the copper in these ores, their utilization under existing surroundings must not be attempted. Other minerals are galena (not seen *in situ*) and hæmatite, in massive beds.

#### GENERAL CONCLUSIONS AND RECOMMENDATIONS TOUCHING THE MINERAL RESOURCES.

The development of the mineral resources is but in its infancy, and I believe that rich stanniferous lodes will yet be found, whilst the prospects already unearthed indicate the presence of good percentage copper ores. Rich auriferous lodes abound over a large tract of country. Hitherto adventurers have made a show of developing the mineral resources, but their action has been protractive rather than otherwise, whilst the honest efforts of the nomadic miners cannot count for much. It is my honest conviction that, with improved machinery for the extraction of the gold and to cope with water, more experienced and honest management, a reduction of working expenses, and above all the introduction of more capital, the gold reefs can be worked profitably and to considerable depths. To hasten the advent of all this, however, there must be a railway to cheapen carriage and make the country accessible to mining and other speculators, and that railway may also be the means of opening up the copper deposits known to exist along the route to Pine Creek. To ensure occupancy and development of the mineral properties, the conditions under which they are held should be rigidly enforced. In the future all mineral rights should be reserved by the State, and the right of search for, and the mining for, minerals upon private lands, under equitable conditions, should be made statutory. As a revenue should accrue direct from the exploitation of minerals, a royalty on the net produce should be exacted, or commuted for by an annual rent, at the option of the lessees. The export tax on gold should be withdrawn, but the alluvial miner should be required to take out a licence at a nominal fee. Alluvial digging is only pioneer work, and should be strenuously encouraged, as leading to permanent settlement—by it the poor miner may acquire sufficient capital to open out additional sources of revenue to the State of a more enduring nature. I recommend the appointment of a warden skilled in geological and mineralogical surveys, and one competent to make chemical analyses, both to reside within the mining district. Apart from their judicial duties, they should be required to geologically survey the country, to impart information touching the nature of mineral specimens, and in all possible ways further the mining interests of the colony. The question of the employment of a drill for determining the character of the deeper parts of the auriferous lodes is one that may be left till the advisability of Government interposition arises.

#### AGRICULTURAL RESOURCES.

So very little has been done to test the agricultural capabilities of the country that the question, "Are the climate and soil of the Northern Territory suitable for the growth of tropical plants of economic value?" is still open for discussion. The soils of the valleys and of the hill slopes are, in my opinion, ill-suited for agriculture; and with a few exceptions the land seen under cultivation was only that reclaimed from the jungle. The chief of the exceptions to which I allude is the soil formed by the decomposition of the diorite rock, massed between Port Darwin Camp and Yam Creek Telegraph Station; it shows great capabilities, if I may judge from the healthy growth of the great variety of culinary and fodder plants under cultivation by the Chinese. Corroborative evidence of its richness is afforded by the reappearance of the graceful palm, *Kentia acuminata*, and, if it really be that species, in a more luxuriant state than it assumes in its northern stations. It abounds about

Fannie Bay, near Palmerston, and occurs at intervals as far south as the Stapleton; thence its place is taken by the fan palm, *Livistona humilis*, which is less choice in its habitat. My opinion of the unfitness of the country generally for agriculture is based on observations. 1. On the nature of the soil; 2. On the general character of the indigenous vegetation; and 3. On certain meteorological phenomena. The "desert sandstone" tableland I leave out of consideration, as it is conceded by all who have traversed it that, with the exception of isolated tracts of the basaltic formation, agricultural operation is impracticable. The pre-

vailing uniformity of rock structure makes it easy to generalize upon the capabilities of the soil. Thus, we have a dry, gravelly, iron and quartz *debris* on the slopes of the metamorphic sandstone; stiff clays with humid surfaces on the metamorphic slates; barren sands upon the granitic surfaces—all of these are comparatively worthless for agriculture. Whilst the soil upon the coast cliffs is generally condemned, Captain King, in his narrative of a survey of the coasts of Australia (1818-22), writing concerning Raffles Bay, says, "The soil in some parts might be called even rich; there were, however, very few places that could bear so favourable a character," vol. I., p. 85. And again, "The land about Port Patterson appeared to be barren and arid," vol. I., p. 271. Captain Stokes, in his discoveries in Australia, expresses the same opinion regarding the Port Essington District. At p. 386, vol. I., he writes, "Generally speaking, however, there is a great deficiency of land fit for cultivation;" and again, "The capabilities of the soil, though it has by some been pronounced totally unfit for agricultural purposes, are still supposed by others to be great, and it is believed that rice, cotton, indigo, &c., might be raised," loc. cit., p. 389. Alluding to the same area, Jukes, in the voyage of the Fly, vol. I., p. 351, says, "The soil generally seemed of the poorest and most sterile description." There are patches of good, if not rich soil, most undoubtedly; but in the aggregate they form a very small fraction of the region of the northern rivers. The opinions touching the capabilities of the soil about the tidal portions of the rivers are very conflicting. King describes the soil abutting on the Alligator and Liverpool Rivers as a sour stiff clay—Op. cit. I., pp. 104 et 259. Stokes says, "While the banks [of the upper part of the tidal portion of the Adelaide] were low—a circumstance very favourable for irrigation and the cultivation of rice"—Op. cit. I., p. 415. Jukes writes, "That rice might probably be raised in small quantities on the borders of the lagoons"—Op. cit., p. 361. I have reproduced these observations because they have reference to portions of the Northern Territory with which I am unacquainted. The meteorological phenomena, which must have a depreciating influence on the value of certain soils for particular crops, are—(1) The intermittent character of the rainfall at the chief period of growth. Many successive days of unclouded sky and hot winds during the wet season must have a deterrent effect on the growth of succulent plants and shallow rooting annuals in particular. (2) The rapid diminution in the amount of rainfall, proceeding in a southerly direction, thus starting with a yearly average of 76.89 inches at Southport, it gradually decreases at the rate of about one inch to every five miles, to 39.23 at Pine Creek. (This will be seen on a reference to Mr. Todd's reports.) The productions of the soil of the Government Gardens at Fannie Bay, reclaimed from a dense jungle, afford evidence that a great variety of useful plants may be successfully grown under similar conditions of soil and situation. But, as I have just shown, the climatic conditions change so rapidly as we recede from the coast that I am dubious, even other things being the same, whether equal results will be gained in the more inland tracts. If we turn our attention to the dominant vegetation we find that it implies, if not sterility of soil, then certainly the absence of those points of character indicative of permanency of atmospheric moisture, and conversely general exposure to the sun. Thus we note the absence of dense lofty forests, scarcity of ferns and epiphytic orchids, no lichens, no liverworts, and only four species of mosses having a very limited range of distribution. However, I believe that in several parts of the colony various species of *Gossypium* (cotton-plant), rice, and indigo could be cultivated, and a fair or even prolific crop obtained. Indeed, good cotton has been produced within the Murray basin (see F. von Mueller, "Select Plants for Cultivation," p. 99, 1876). The rice-plant is indigenous to the Northern Territory, having been found by Baron F. von Mueller in the marshes about Hooker's Creek, by Mr. Wilson in the marshes of the valley of the Norton-Shaw River, and by Mr. J. A. Giles in the valley of the Birdum Creek. The tamarind is also a native, having been noticed first by Leichardt at Port Essington, and subsequently by Mueller on the cliffs at the entrance to the Victoria River. Another useful plant indigenous to the country has been overlooked. It is *Tacca pinnatifida*, from the tubers of which the main supply of the Fiji arrowroot is prepared. I noticed it growing in rather humid gravelly soil here and there from Palmerston to Pine Creek.

#### PASTORAL RESOURCES.

The humidity and high temperature of the air during a portion of the year cannot be conducive to the rearing of sheep within the region of the northern rivers. Jukes says, "Sheep, if they lived at all, would soon have their woolly coats changed into hair."—Op. cit., p. 361. Landsborough writes that "The kangaroo grass, though of itself possessing excellent properties [the species of *Anthistiria* referred to is probably *A. ciliata*, one of the chief constituents of the herbage on the plains between the Adelaide River and Bridge Creek.—R. Tate] is so certain an index of humid soil, which is on the whole unfavourable to sheep, that I cannot agree with many squatters in their estimate of the country on which it is found."—Narrative of Explor. Gulf of Carpentaria, p. 36. What is true with respect to