HISTORY AND SUMMARY OF RESEARCH IN CHILLAGOE BY BROTHER NICHOLAS SULLIVAN TO END 1986.

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HISTORY

Following much urging by the Matts family with reference to the potential for scientific work - particularly biospeleological - in the Chillagoe area, Brother Nicholas Sullivan visited the area in 1978. He was very impressed with the area and its potential.

In 1981, while on his annual Australian pilgrimage, he arranged to again visit Chillagoe with the view of mounting a large expedition in June - July 1982. He visited several caves and assessed the potential for specimen collection as excellent. While thus enthused he met the Qld minister for National Parks, Tourism, Sports and Arts, Mr. Tony Elliott, who pledged his, and his governments support for an expedition in 1982. This meeting was reported as a news item in the Cairns Post.

"Chillagoe Caves World Centre?

THE EXPEDITIONS (to date)

1982

From July 5 to July 19 - This expedition was the largest so far and consisted of eight Americans and five Australians assisted by sundry members of SSS, NSWITS, and CCC, somewhere in the vicinity of 35 adults and three children.

Studies were done in the areas of archaeology- by Drs Charles and Ellen Brush from U.S.A., palaeontology - by their daughter Karen Brush, biology - by Elery Hamilton Smith assisted by the two students from Manhattan College U.S.A., while Simon Bland looked after the surveying of the various caves used as collection sites.

Unfortunately the area was particularly dry, having not had the usual °wet season' and the late timing of the expedition - July was felt to be too late in the year for best collection. However, some 200 specimens were delivered to the Qld Museum for identification. They were not enthusiastically received as Dr. Monteith had just finished a transect of the Atherton area and over 2000 specimens he had collected there to be identified. He thanked us but pointed out that the Atherton transect would have to be done first.

1983

From June 6 to June 16 - due to financial restraints this was a much smaller expedition, consisting of six Americans and sundry members of CCC who assisted greatly, and one from SSS. As it was in June, this was not a convenient time for members of the Sydney clubs to assist.

As the north of Queensland was in the grip of a drought the water tables were even lower than in 1982. This made access to the deeper parts of the caves easier but reduced the availability of specimens to almost zero.

Of significance were the phone calls from both the Premier's office and the Minister for Tourism, T. Elliott. These precipitated a visit to Brisbane by Brother Sullivan to talk to them both. While there, he discussed the future of the Chillagoe area as a research centre and again got their support. He also visited the Museum where he talked with the director and staff members. They were eager to provide assistance on forthcoming expeditions and expressed enthusiasm for the project, having already identified some of the specimens from the 1982 expedition as being new species.

1984

From June 10 to July 6 - This expedition had the benefit of two entomologists from Bishop Museum, Hawaii, together with three Americans, two Australians and the invaluable assistance of sundry CCC members.

This proved to be one of the most exciting expeditions to date. Whether the conditions for collecting had improved or whether the benefit of having two very experienced entomologists with the group were responsible, the results were fantastic. So many specimens were collected it will take years to identify them all. Already, with their experience, the entomologists were able to state that many new taxa were collected.

Prior to this expedition Brother Sullivan had spent most of the week in discussions with the Queensland government and NPWS officials over access problems in the Chillagoe area.

Following the expedition both the entomologists attended the Queensland Museum to discuss their collections and all the problems associated with the immense task of identification and comparison with those specimens from the previous expeditions. A solution was reached when it was decided that unidentified specimens should be sent to qualified taxonomists to study them. Meanwhile Brother Sullivan returned to Sydney to spend the next few days with the staff of the Australian Museum making tentative plans for the future expeditions.

1985

Unfortunately I was not involved in this particular expedition and there seems to be no documentation available at this short notice. It ran during the month of June and was attended by four Americans including the two entomologists. Of course CCC as usual provided their invaluable support.

The main feature of this expedition was the discovery of the immense fauna in the lava tubes of the Mt Garnet area, resulting in the desertion of the caving area in favour of the lava tubes. The entomologists worked tirelessly (and ate as if each meal was to be their last) leaving reluctantly but with assurances that they would return next year.

Further negotiations were held with the Premier and the Minister for NPWS.

1986

From May 24 to June 17 - Only one of the entomologists could attend this time, the other was doing studies in the caves of thailand. Brother Sullivan was assisted by a student from University of Queensland and five Australians together with the usual CCC support team.

Following their experiences in the lava tubes the entomologists had decided that the foul air required additional equipment as a standby. This did not deter him and as soon as he arrived he went straight to work. Collecting was done in the cave area as well.

This expedition had the benefit of the photographic ability of Johann Pfeiffer. This enabled us to have the photos developed, assessed, and available for Brother Sullivan to use prior to his return to U.S.A. Unfortunately the duplication was done in U.S.A. and the quality was nowhere near as good as the originals. Next year we will make sure that the duplication is done in Australia or two photos taken of each subject.

During the expedition discussions were held with various people re the setting up of a research station in Chillagoe to the stage of inspecting available land. At this time I am unaware of the outcomes.

FUNDING

All expeditions have been funded by:

The Explorers Club of New York
Manhattan College, New York
The Manly Foundation
DuPont Australia
Sundry Individuals

OUTCOMES

Following the 1982 expedition Brother Sullivan forwarded to us a summary which gave an overview of the material collected.

Chillagoe Caves Biology - A Summary - 1982

Only samples of each cave population were collected to prevent depopulation of the cave..... The bulk of the collecting was conducted by Elery Hamilton-Smith and a student from Manhattan College, New York.... Several scientific papers will be forthcoming as a result of expedition activity, but until then the following summary will give an overview of material collected.

1. Annelida

Several earth worms were collected in the Ryan Imperial Tower from Marachoo Cave (CH33).

2. Crustacea

a) Amphipoda. At least one, and possibly two troglobitic species were collected in Marachoo Cave (CH33), Giant Causeway Cave (CH78) and Ryan Imperial Cave (CH4). The extreme low water table made collecting of these aquatic shrimp-like organisms difficult. Another species was collected in Tea Tree Cave (CH43-101). Additional collecting will

have to be postponed until after a season of rain sufficient to raise the level of water in the pools of the caves concerned.

b. These terrestrial crustaceans (Pill-bugs) are fairly common in the leaf litter and mud of Chillagoe Caves. Most, if not all, are surface forms that have wandered into caves seeking food and/or shelter. Large numbers were seen and collections made in the Spring Tower in the Spring Cave System (CH12-60-89-90). Others were found in Donna Cave (CH2), Marachoo Cave and Ryans Creek Cave (CH123). Non-pigmented forms have been previously reported from Markham Cave (CH10) (Wellings 1969).

3. Arthropoda

As was expected, the great majority of material collected were either insects or arachnids. Many of the caves were bone dry due to the prolonged drought and it was the opinion of those who had visited Chillagoe before, that representatives of all taxa were reduced in number compared to normal conditions.

a) Diptera. Fruit flies (Drosophila) were collected at Royal Arch Tower and Royal Arch Cave (CH9-50). Practically all the other major cave systems contained one or more species of dipterans and collections were made at the Walkunder Tower from Spatial Cavern (CH41); the Queenslander Tower from Queenslander Cave (CH51 entrance); the Spring Tower from Spring Cave (CH12 entrance); the Tea Tree Tower from Tea Tree Cave (CH43 entrance); the Ryan Imperial Tower from Marachoo Cave: and from Wallaroo Tower from Giant Causeway Cave. Mosquitoes (Culicoides sp.) were also collected, plus several specimens of Phlebotomus from Trezkinn Cave (CH14) in the Donna Tower.

b) Hemiptera. A number of Rediviidae (assassin bugs) were found in the Tea Tree, Donna, Queenslander, Spring and Walkunder Towers. It is not improbable that at least one new species is represented in this collection. Smaller numbers of Homopterans, mainly Cixiidaens, were collected in the Donna, Haunted (from Spooked Cave (CH7-8)) and Royal Arch Towers.

c) Hymenoptera. Ants of an undetermined species belonging to the family Formicidae, were found in Tea Tree Cave (from both the CH43 and CH101 entrances). The high heat and humidity of this cave undoubtedly attracts these organisms.

d) Lepidoptera. Several Tineideans were seen in most of the major cave systems. These were occasionally collected fairly deep within the cave but otherwise are almost always found at the entrance - common in the Queenslander, Spring, Donna, Royal Arch, Tea Tree, Ryan Imperial and Wallaroo Towers and in the Tower of London Cave (CH5).

e) Orthoptera. The wetas or crickets (Endacusta) occur in all the major cave systems. Individuals were collected in the Tea Tree Tower (from Tee Tree Cave); the Carpentaria Tower (from Carpentaria Cave (CH77); The Ryan Imperial Tower (from Marachoo Cave); the Wallaroo Tower (from Giants Causeway Cave); the Walkunder Tower (from Octopus Hollow CH40); the Tower of London Tower (from Tower of London Cave); the Haunted Tower (from Spooked Cave); the Queenslander Tower (from the New Southlander CH81 entrance); the Spring Tower (from Spring Cave CH12 entrance and Gecko Cave CH13); the Eclipse Tower (from CH208); the Donna Tower (from Bauhinia Cave CH125); and from the Royal Arch Tower (from Royal Arch Cave). These crickets probably migrate in and out of the cave system, depending on available food supplies.

f) Blattodea. These cockroaches (Fam. Blattellidae) are among the most common inhabitants of the Chillagoe Caves. They also provided one of the most significant discoveries. In 1967, a single specimen of a troglobitic cockroach was recovered from Trezkinn Cave (Wellings 1969). It had greatly reduced eyes, vestigial wings and a near transparent cuticle. Unfortunately, this specimen was misplaced and apparently lost by the institution to which it was sent for identification. Two more specimens of what is assumed to be the same species were collected from Trezkinn Cave during the recent expedition. In addition, three specimens of another, possibly troglobitic species, was collected from the Tea Tree Cave System. The only previously identified species of troglobitic cockroach from Australia is Trogloblattela Nullarborensis, found in the caves of the Nullarbor Plain. Many specimens of the Oriental cockroach (Blatta orientalis) were found in all the major cave systems that were explored.

g) Mecoptera. Six of the long winged scorpion flies were collected from three sites in the Spring Tower.

h) Thysanura. The silverfish are among the most primitive of all insects. Several were recovered from the Queenslander Tower (from the New Southlander entrance CH81). Although these organisms may appear to be adopted to a cavernicolous existence they are in reality surface form.

i) Coleoptera. Several species of beetles were collected in Clam Cave (CH26) in the Walkunder Tower. This cave is a major swiftlet nesting site and has copious quantities of guano on the floor. Both troglobitic and trogloxenic forms were found. However, attempts to collect the only previously known troglobitic Pselaphid from Chillagoe, originally found in Trezkinn Cave, were unsuccessful. One or more species were collected from most of the cave systems.

4. Arachnida

a) Acarina. Guano mites (Ixodiedae) were collected from two caves in the Walkunder Tower (from Clam Cavern and Spatial Cavern); and in Royal Arch Tower (from Royal Arch Cave).

b) Araneida. At least three species of spiders and huntsmen (and possibly five) were collected from all the major cave systems. Most belong to the family Pholocidae and, although widespread in the Chillagoe Caves systems, none demonstrate adaptations to a cavernicolous existence.

c) Pseudoscorponida. The first reported pseudoscorpions from Chillagoe were found in Tea Tree Cave and additional specimens were collected in the Royal Arch Tower (from Royal Arch Cave).

5. Chilopoda

a) Scutigeromorpha. Centipedes, all epigian forms were collected from caves in the Tea Tree Tower (Tea Tree Cave); the Queenslander Tower (New Southlander entrance); and Ryans Creek Tower (Ryans Creek Cave). All belong to the Scutigeridae.

6. Mollusca

a) Gastropoda. Snails were located in three caves in the Royal Imperial Tower (Ryan Imperial Cave, Keefs Cavern CH24 and Marachoo Cave); The Markham Tower (Markham Cave CH10); the Haunted Tower (Spooked Cave); the Queenslander Tower (New Southlander entrance); and the Royal Arch Tower (Royal Arch Cave).

Many species of bats and birds were observed in and near cave entrances, but no collection was made of vertebrates. It is planned to return to Chillagoe in May or June of 1983 to undertake more intensive collecting, if there is sufficient rainfall. In either 1983 or 1984, collections will be made in those areas not previously studied. It must be stressed that it will take several years before a definitive review of the Chillagoe cave fauna can be published.

From the 1986 Expedition report I have taken the highlights as follows:

...Howarth and Irvin collected between 10 and 15 new troglobitic invertebrates in Long Shot and 210 Caves (lava tubes). Among them is a blind thread-legged bug and a new Nocticola related to those at Chillagoe Caves. Two suprising troglophiles (?) were also discovered. The first is a blue Peripatus, probably a new species. Peripatus are rare in collections - this was captured in the deep cave zone. The other suprising discovery is a population of singing crickets in the deep cave zone. Virtually all cave crickets world wide are mute. Only a few singing crickets are known from Indonesia to the Philippines. These are first from Australian caves.

Howarth... had made 27 visits to 18 different caves, collecting both environmental and biological data. Nearly 1000 specimens of invertebrates are now being processed and identified.

...Howarth and Irvin moved camp to Yaramulla Station to study lava tubes in the Undarra Lava Flow. Their main quest was to repeat the faunistic survey along the environmental gradient which they did in 1985. As expected, species distrubution was strongly correlated with environmental conditions. However, COs concentration reached only 4.5% and some troglobites were scarce.

Since the collections have been so large and the work involved so difficult there has been no opportunity to detail the results. Several papers on the work are in process at this time. One of the most prestigious nature magazines have accepted an article for publication in 1987.

Both entomologists, Drs Frank Howarth and Fred Stone, have had their work in Chillagoe recognised by the NSS - receiving Certificates of Merit.

Brother Sullivan is now firm in his belief that it is essential to set up a research station in the Chillagoe area as soon as is possible and is working towards this - having the support of the Queensland Premier and the Minister for NPWS.

At this point I would like, on behalf of Brother Sullivan, to express his appreciation of the assistance give to him by the Chillagoe Caving Club and other caving club members during these expeditions.

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