

NOTES AND SOURCES OF INFORMATION

Many colleagues in the Caribbean have been consulted in the course of collecting information for this survey. While the responsibility for accuracy of facts and soundness of opinions is entirely that of the author, the following list includes the names and addresses of colleagues round the Caribbean who assisted in the survey and/or may be willing to provide further information or to direct inquiries. All of those who have been approached in the final stages have confirmed their willingness to field enquiries, but a very small number did not receive the opportunity to assure the author that they would do so. Accordingly, inquiries should be directed in the first instance to the appropriate address given below or, in the case of difficulty, to the author.

1. Education has been, and still is, dominated by GCE, well known in other parts of the Commonwealth. Only the Cayman Islands appear to have adopted CSE. The first CXC examinations for the same age group, in a limited number of subjects, took place in 1979 and were on the whole optional. The impact of CXC on education in the region is already considerable and will certainly increase.
2. Caribbean Examinations Council Headquarters, The Garrison, St Michael 20, Barbados. (But the syllabuses and papers are so far not available for general circulation.)
3. Winston King, School of Education, UWI Cave Hill, Barbados. King, by virtue of his post with the Research and Development Section of the Cave Hill School of Education, is the best source of general information about the 'small islands'. He is also regional representative on the ICASE Executive.
4. Dr June Mitchelmore, Education Officer (Science), Ministry of Education, Kingston, Jamaica.
5. Since an 11+ or Common Entrance Examination, which filters children from primary to secondary school, is a feature of the region, some children fail to pass through the filter. These children were, and in some countries still are, accommodated in the secondary classes of primary schools. In Guyana, the community high schools have been set up to accommodate them although SDSP, the science course for this population, retains its old name.
6. Cde Alec Farley, c/o Ministry of Education, Social Development and Culture, Georgetown, Guyana. Farley's Report of the 1977 Guyana TVC has proved most useful for this survey, and is to be commended for its objectivity (see Bibliography, Dalgety and Farley).

7. Cde Esther Burrows, Deputy Chief Education Officer, Ministry of Education, Social Development and Culture, Georgetown, Guyana.
8. Cde Florine Dalgety, Education Officer (Science), Ministry of Education, Social Development and Culture, Georgetown, Guyana.
9. Mrs Pamela Fraser-Abder, School of Education, UWI St Augustine, Trinidad; and Raphael Douglass, Ministry of Education and Culture, Port of Spain, Trinidad.
10. Khan (1980) carried out a useful investigation into the extent to which teachers actually need to use distilled water in chemistry. He concluded that the tap water in his neighbourhood was quite adequate for titrations but could lead to problems with qualitative analysis.
11. Dr Oliver Headley, Department of Chemistry, UWI St Augustine, Trinidad.
12. Recent information is that the design, reproduced with permission from elsewhere, is outmoded.
13. Hewell Campbell, Jamaica College, Kingston 6, Jamaica.
14. Dr John McDougall, now in Canada; inquiries to him c/o Department of Physics, UWI Mona, Kingston 7, Jamaica, may be forwarded.
15. Clarence Drayton, c/o Faculty of Education, University of Guyana, Georgetown, Guyana; semi-retired, Drayton maintains contact with UG and with STAG.
16. Dr Anthony Chen, Department of Physics, UWI Mona, Kingston 7, Jamaica. The electronics teaching kit was the work of Chen's student, P G Wilson. With some support from OAS, Chen has put a lot of work into the improvement of physics teaching in schools.
17. Dr Patrick Chin, Department of Physics, UWI Mona, Kingston 7, Jamaica. An associate of Chen (see Note 16), Chin was the main co-ordinator of the Models project and was responsible for the production of the set of overhead projector transparencies for the teaching of applications of physics.
18. It is not true that apparatus chosen from the laboratory suppliers is always like the apparatus used by scientists; and one sometimes wishes that teachers would select apparatus rather closer to the scientists' apparatus than the designs of a century or more ago.
19. Some schools order direct from the UK manufacturers; others order through local manufacturers' agents or governments. In any case, the local agent receives a commission; some teachers are very dependent on the service he provides, so that he can serve an essential, though rather expensive, function. One Trinidad school has discovered that air freight costs no more than surface shipment, and is much quicker.
20. Many teachers do not find it easy to obtain petty cash from their schools, so that local purchase is not as simple as it might seem. Some schools require that the purchase should be made by the Bursar in person; since local purchase generally demands some kind of compromise between specifications and availability, the

Bursar is quite likely to return with materials which the science teacher cannot use.

21. Mrs Janice HoLung, c/o Ministry of Education, Kingston, Jamaica.
22. Mrs Dorothy Pottinger, Ministry of Education, Kingston, Jamaica.
23. Leo Jones, Acting Director, Science Education Centre, Department of Physics, UWI Mona, Kingston 7, Jamaica. Jones gave invaluable service in selecting the sample for the survey of resources in schools in Jamaica, reproducing the checklist from stencils, distributing it, and returning the responses. His Centre has always acted as the ultimate information resource about science education in the Caribbean.
24. John Masters, Ministry of Education, Social Development and Culture, Georgetown, Guyana. Masters is to be especially thanked for the fact that the Guyana return for the checklist exceeded that of the other countries, while its population is the least.
25. Advanced Physics Project in Independent Learning. Teachers' Handbook. London: John Murray, 1978. (Developed by the ILEA.)
26. Lockhart, J. O Level Physics Apparatus. Journal of Education in Science for Trinidad and Tobago, vol. 7, no. 1 (October 1979), pp. 22-27. Suggested quantities and prices were omitted from the checklist sent out for the survey.
27. Rev R E McCluskey SJ, St George's College, North Street, Kingston, Jamaica. Fr McCluskey is Teacher 25 in Appendix 4.
28. Although the difference in responses to the booklist did not quite meet the 0.05 test of significance, Trinidad and Tobago responses were higher than those of the other two countries. It is doubtful that there is a direct relationship with national economy, since teachers were asked to indicate only if 'at least one copy can be made available to yourself and your students'.
29. Catalogue references were supplied, but it was subsequently discovered that a valuable resource not available to some teachers is the suppliers' catalogue. Even where laboratory supplies are centrally ordered by the government, the catalogues provide a wealth of information to the teacher and laboratory assistant in their laboratory.
30. A few integrated science teachers, like the physics teachers, probably hoped to catch the eye of the Ministry and were over-demanding; it is not easy to accept that a school would have some ear models, for example, in grossly inadequate quantities.
31. It is curious that local preparation of skeletons is so rare. One school heard of a report of a whale carcass on a distant beach; the resourceful teacher organised a large truck to transport the bones so that the school now has a stunning collection. A whale vertebra two metres across is an impressive visual aid. Children in another school reported a dead horse and helped the teacher to bury and ripen the carcass and eventually to get it to the school. A colleague in Fiji built up a thriving business by collecting the dog-catchers' carcasses, treating them, and

exporting the sets of bones to suppliers in New Zealand. While some teachers do make their own bone specimens, Appendix 5 suggests that a need could be filled by local mini-mass production, perhaps by a science teachers' association. Advice on techniques appears to be scarce in the available literature.

32. In one country a non-scientist teacher-educator proposed to a National Consultation Committee on Education a company which would manufacture 'a whole range of science equipment which could be used in hospitals, factories and schools'. Unfortunately, the idea came to nothing.
33. Miss Myrtle Manbodh, Holy Name Convent, Port of Spain, Trinidad.
34. Mrs Jean Bahadur, Naparima Girls' High School, San Fernando, Trinidad.
35. McSood Hosein, Queen's College, Georgetown, Guyana.
36. Miss Bernadette George, Bishop's High School, Tobago, Trinidad and Tobago.
37. Bottle racks appear to be a relic of the days when chemistry curricula contained much more qualitative analysis than they do now, and when the only children allowed into a chemistry laboratory were mature and responsible sixth formers. The tendency today for younger children to tamper with bottles makes the contents of the bottle racks untrustworthy.
38. Richard Ishmael School in Georgetown, Guyana, has separate laboratories for biology, chemistry and physics; but the integrated science teacher, Cde Jaggernaut, worked in a flourishing laboratory provided by re-arranging the desks in a classroom. A large class was observed to be working very comfortably in small groups carrying out a titration with burettes. This school's carpenter had made a range of equipment such as burette stands, pipette racks and lamp boxes for optics work. Since school carpenters also make laboratory stools usually much more functional than the commercial variety, a school carpenter might be considered a valuable member of the science staff.
39. Miss June Alfred, St Mary's College, Port of Spain, Trinidad.
40. A teacher in training under Guyana's Emergency Science Programme, Cde Frankie Gordon at Charlestown Government Secondary School, has found such a use for an installation that other teachers abandoned as hopeless; additionally, he has worked out an instant way of diverting the gas from the children's benches to the teacher's.
41. The idea of covering glass windows in this way has been curiously difficult to sell. The objections appear to arise from an intuitive aversion to an unfamiliar strategy, and teachers who perceive the potential must still face resistance from their principals and then the workmen. The St Augustine experience is that the room is attractive, convenient and easy to work in, not least because the excessive tropical light can be controlled at will. At no time does rain force closure of windows on more than one side of the room, so that an adequate level of illumination is always available. With all the windows closed for blackout,

the room is hot, but ventilation is quickly restored at convenient breaks in the presentation.

42. Michael Owen, Ministry of Education and Culture, Bridgetown, Barbados, has stimulated much of the achievements in science education in Barbados, not least the educational television, primary science curriculum and BASE, and is well informed about the current state of science education activities in the country.
43. Workeley Brathwaite, School of Education, UWI Cave Hill, Barbados.
44. This example from a variety kindly supplied by the Guyana Ministry of Education was chosen for its interest to physics-educators as well as to those concerned with integrated science. And it provides an opportunity for reminding children of the dangers of cigarettes.
45. Cdes Edith Callendar and Carol Allicock, Curriculum Development Centre, Ministry of Education, Social Development and Culture, Georgetown, Guyana.
46. Bruce Paddington, Mucurapo Senior Comprehensive School, Port of Spain, Trinidad.
47. Mrs Denise DeBique, St Stephen's College, Princes' Town, Trinidad.
48. The staff photographer, Neil Hoka, has kindly taken the photographs for this paper.
49. Mrs Florence Commissiong, School of Education, UWI Mona, Kingston 7, Jamaica, guided the production of the master set of photographs.
50. Fr Benedict OSB, Mt St Benedict Comprehensive School, Tunapuna, Trinidad.
51. Details of pupil texts for integrated science produced in the Caribbean may be obtained from the publishers, Heinemann, Longman and McGraw-Hill Far Eastern. Macmillan should also be able to provide a useful list.
52. Mrs Herma Perkins, Science Education Centre, Department of Physics, UWI Mona, Kingston 7, Jamaica.
53. CRSP provided book collections to quite a few Eastern Caribbean countries.
54. The entomological collection is in the care of Tom Farr; G R Proctor is responsible for the plant collection. The Institute of Jamaica, King Street, Kingston, Jamaica.
55. An earlier series, Glimpses of Jamaican Natural History, in two editions between 1946 and 1949, was re-issued in about 1976.
56. The UWI Mona Herbarium is at the Department of Botany, UWI Mona, Kingston 7, Jamaica. The curator of the Trinidad National Herbarium is Miss Yasmin Baksh, c/o Head, Department of Biological Sciences, UWI St Augustine, Trinidad. Detailed descriptions of the flora of Jamaica and of Trinidad have been published; these are not easy for the average secondary school teacher to use, and while science-educators repeatedly ask for biological keys, such

keys are not feasible, given the variety of organisms that may be encountered on a field trip. Teachers are encouraged to approach museums and herbaria, by mail if convenient, to seek identification.

57. In a personal communication, the ICASE Secretary has commented on the opportunities for inputs from science teachers' associations worldwide into a more ambitious publication of this nature. The present problems, he observed, were time and money, but it is this author's view that such demands would be relatively modest.

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