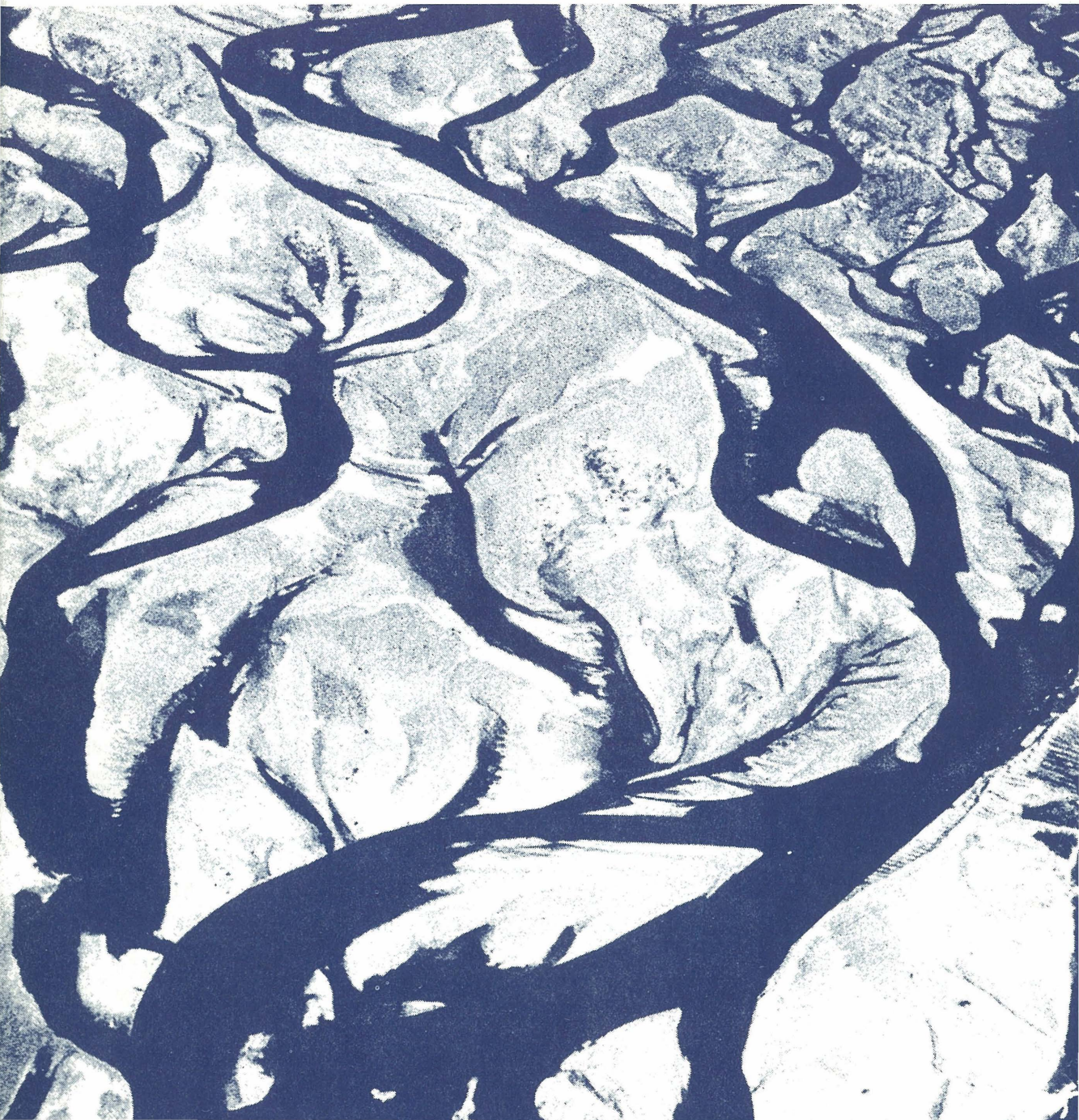
Item 14

# To Stream or Not to Stream?

set 76
number two



# To Stream or Not to Stream?

## Research on Streaming: A Review by Warwick B. Elley, Assistant Director, NZCER

*'Perhaps no plan, method or device for reaching the individual through class instruction has evoked more words, written or spoken, during the past ten years than homogeneous or ability grouping.'*

(*R.O. Billett*).

The assertion above was made, not in 1976, but over 40 years ago, in a review of the research on ability grouping published in 1932. Are we any further ahead today? Issues of grouping and streaming are still hotly debated by teachers and administrators. Many are moved to turn to the research workers, and ask the simple question — Should we stream our children into homogeneous ability groups? Like most questions concerned with school organization, there is no simple answer. It depends on our objectives, our classroom conditions, the qualities of the teachers available and the teaching methods they favour. Attitudes to streaming are influenced greatly by whether we see the schools' primary function as that of training in the basic skills, or socialising children to live in a heterogeneous society.

The practice of streaming as a method of coping with individual differences within a school has a long and chequered history. In New Zealand, the tradition was already well established when secondary education for all was undertaken seriously, following the Thomas Report of 1944. The method continued to be regarded as the logical way of producing teachable groups of pupils. A 1935 regulation of the Department of Education required intermediate school principals to classify pupils 'in accordance with their attainments and aptitudes', and Dr Beeby's 1938 national survey showed that most schools adhered to the regulations. So too did Watson's 1964 survey.

The publication in 1969 of **Education in Change**, the report of the PPTA Curriculum Review Group, marked a new period of questioning of this and other long-accepted practices in the secondary schools. Research was reported from Sweden indicating that more children profit from mixed ability groups than from homogeneous classes, and many teachers, concerned at the apparent social and ethnic divisiveness of streaming, began to experiment with various forms of mixed groupings and partial streaming. A more flexible approach to course structure in third and fourth forms has contributed to this trend. Today, rigid streaming by ability is rare in both secondary and intermediate schools.

In England the recent expansion of comprehensive secondary schools has prompted a reconsideration of the issues, and a large-scale research project undertaken by the National Foundation for Educational Research (NFER) in the 1960s revealed once again that children gained socially, and did not suffer academically, from being placed in non-streamed classes. A recent report from the Scottish Council for Research in Education indicates that most

British comprehensive schools have swung away from homogeneous grouping to various forms of school organization which allow for the regular mixing of all social and ability groups.

Similar trends are occurring in other countries, and research on the pros and cons of streaming has stepped up in recent years. Some of the New Zealand schools which have introduced non-streaming have attempted to evaluate the effect on their pupils, but the short term influence is so slight and diverse, and so difficult to detect without large long term and carefully controlled studies, that we are forced to draw our conclusions from overseas research. While the reported research studies on the effects of ability grouping are very numerous, it is regrettable that well conducted, conclusive investigations are all too few.

## Overseas Research on Streaming

In this review, the terms streaming, homogeneous grouping, and ability grouping are used synonymously to refer to the grouping of pupils into separate classes for the basic subjects with a view to reducing the range of their abilities and instructional needs. Clearly this practice does not eliminate differences between pupils, but those who apply it believe that it reduces them to more manageable proportions. In this connection it is worth noting that a review by Goodlad showed that if pupils were grouped into homogeneous classes on the basis of general ability, the reduction in variability in achievement is less than 10 per cent for a 2 group division and 20 per cent for a 3 group division. This disappointing outcome has been confirmed in several studies.

Although the practice of ability grouping can be traced well back into the 19th century, systematic evaluation of its advantages did not begin until 1917. In reviewing the research between 1917 and 1928 Billett claimed that, of the 108 'experiments' reported, only 4 were 'properly controlled'. In view of the inadequacy of the research, and considering that the climate was favourable to ability grouping, it is not surprising that 86 per cent of these so-called 'experiments' found more advantage for streaming, and most of the remainder were inconclusive. Poorly controlled research studies usually throw more light on the attitudes of the researcher than on the issues he investigates.

In 1959, Ruth Ekstrom identified 33 experimental investigations which compared the effects of homogeneous and heterogeneous grouping, on children's achievement. Of these 13 favoured homogeneity, 5 produced mixed results, depending on the pupil qualities assessed, and the remainder found against homogeneous groups.

In 1961 Daniels reported that the vast majority of English primary school teachers favoured streaming by ability and/or attainment. However, his 4 year experimental study of 2 pairs of schools did not support the teachers' views. One member of each pair of schools had three streams; the other member was non-streamed. The schools were closely matched in other respects, although it was reported that the teachers in non-streamed schools tended to be keener and more interested in their work. The evidence showed that in non-streamed schools the average IQ increased by three points with similar improvements in reading, arithmetic and English. There was also

a consistent tendency towards a reduction in the range of ability in non-streamed classes. The slow pupils tended to be 'pulled up' more. This experiment has been widely quoted in support of the non-streaming cause, but because of its relatively small numbers and uncertain controls, further confirmation is required.

Such support was provided in a most ambitious investigation, undertaken in New York in 1962 by Goldberg and others. Three thousand 10 year old pupils in 45 elementary schools were classified into 5 IQ levels, ranging from gifted to low average. They were then placed in 86 classes of varying patterns, some having a narrow range of ability (1 or 2 IQ levels), some medium (3 IQ levels), and some having a broad range of ability (4 or 5 IQ levels). The classes stayed together for 2 years, and were retested at the end of their 11th year. The instruction was not modified deliberately for the purposes of the study.

While the differences between groups in their final achievement tests were slight, most of them favoured the classes which had a broad range of ability. Of the 105 possible comparisons between pupils in 7 achievement tests, only 11 were statistically significant, and in 10 of these, the broad range classes were superior. It was generally found that pupils' learning was influenced more by the quality of the teacher, and by the initial ability of the children studied, than by the extent of streaming which had taken place. Nevertheless, the first two are not as amenable to change as the policy of streaming, and so the search for truth continued. Goldberg's study certainly gave no comfort to the supporters of streaming by ability.

One other meticulous study of streaming in American schools was that undertaken by Borg in Utah in the 1960s. For a period of 4 years, he compared the achievement and personality development of 4,000 pupils, from Grades 4 to 9 (9 to 13 years of age) from 2 neighbouring school districts, one of which used ability grouping with acceleration, the other 'random grouping with enrichment'. The progress of pupils was assessed regularly in reading, mathematics, language, science, and social studies, as well as in study habits, self-concepts, sociometric status, attitudes, personal problems, and other personality dimensions. Although most achievement differences between schools operating under the two policies were very small, there was a significant superiority in mathematics and science for bright pupils in streamed classes in the first years of the study. These differences had faded into insignificance by the third and fourth years however, and should be seen in perspective. Moreover, the author could not discount the 'Hawthorne' or 'Experimental' effect as one explanation for the temporary improvement of the brighter pupils in the streamed groups. Streaming was a novel policy for these schools, widely publicized in the local press. If there were a real advantage in streaming it would surely be cumulative, and reveal itself in greater achievement differences as the pupils grew older. In fact, the reverse was found. By contrast, the slow pupils in the non-streamed groups showed improved achievement at several points in the study.

Other results showed that pupils in non-streamed groups developed significantly better study habits, healthier self-concepts, a better 'feeling of belonging', and generally had fewer personal problems. These differences were

more marked with slower pupils. Few consistent differences were found between the two policies in the sociometric choice patterns. In appraising the overall results, Borg finds a slight advantage for the ability grouping policy, because of the higher achievement gains amongst bright pupils, but emphasises that other reviewers with different value orientations would see more advantages in the non-streamed pupils' results. Certainly, the balance of evidence on personality and attitude measures favoured the non-streamed pupils, and when it is considered that the achievement advantages of streamed groups were both temporary, and confined to bright pupils, it is difficult to support the author's conclusion.

In England, the most extensive investigation of the problem in recent years has been that undertaken by NFER. Joan C. Barker Lunn made a study of 5,500 children in 72 streamed and unstreamed primary schools, and Elsa Ferri investigated the progress of 1,700 of these children into the secondary school. In the primary school phase, Barker Lunn found no differences in formal attainment attributable to streaming **per se**. This finding applied to both boys and girls, bright and slow, upper and lower social classes, and to children with 'progressive' and 'traditional' teachers. As the author put it, 'the decision to stream or non-stream must rest upon factors other than formal attainments'. (p.70).

On measures of social and emotional development however, some interesting differences did appear. While bright children developed favourably under both kinds of organization, it was clear that in streamed schools, the attitudes to school work of average and below average children were consistently found to deteriorate. In non-streamed schools, however, children in these ability levels actually improved in these respects. Again, pupils in non-streamed schools participated in more informal activities in the school and showed higher scores on tests of creative thinking. The children studied were very aware of the streaming process, and there was clear evidence that it coloured their motivation toward their school work. In streamed schools, a pupil's attitudes to school and his relationships with his teacher were closely related to his stream: in non-streamed schools they seemed to depend more on his teacher.

In conclusion, Barker Lunn points out that the social and emotional development of average and below average children was found to be better in non-streamed schools. This squares nicely with Borg's results. More important, however, is the teacher's attitude toward streaming. Teachers with the values of 'streamers', typically put greater emphasis on academic success, and appeared to communicate their dislike of the below average pupil. The pupils of these teachers showed the least desirable attitudes to school, regardless of the organizational policy of the school on streaming.

How long-term are these effects? Does the influence of streaming in primary school continue into the secondary school? Ferri followed up 1,700 pupils into 83 secondary schools, more than half of which used some form of streaming. Once again, there were no differences in attainment between children from streamed and non-streamed primary schools. There was tentative evidence that pupils in

non-streamed secondary schools performed better on tests of creative thinking, and participated in more school activities, but it was the present form of school organization rather than that of the primary school that was critical. Generally, the influence of streaming in primary school appeared to wear off quickly. The author concludes that 'any decision regarding organizational policy in the primary school should be taken solely in the light of the benefits and disadvantages which have been shown to operate at the junior level.' (p.73). It must be added that neither of these NFER studies provided any support for the proponents of streaming. In this respect, they confirm the findings of most of the larger, well-controlled studies on streaming in recent years.

One other overseas study deserves attention, as it has been widely quoted in New Zealand. This is Svensson's 1962 investigation of 11,000 Swedish children, some of whom were streamed at 11 years, the others not till 13 years. Svensson reported that a comparison of the two groups did show some short range differences in achievement. After 18 months, pupils in top stream classes were performing slightly better than their counterparts in non-streamed classes in reading, mathematics, writing and intelligence. In the follow-up study, however, the differences in achievement were reduced, and attributed largely, by the author, to the better qualified teachers who had taught the streamed groups. By ages 14 to 15 years, achievement differences between the 2 groups had disappeared. Once again, the author concludes that the effects of streaming on pupil achievement are negligible.

It is interesting to note that several major studies have shown early advantages for bright children in streamed groups, advantages which fade into insignificance as each study progresses.

## New Zealand Research

In New Zealand the question of whether or not to stream has more often been the subject of staff-room debate than of controlled investigation. No large-scale research studies comparable to those of Goldberg, Borg, or Barker-Lunn have been reported to date, but a number of student theses have explored the implications of streaming in school. Roth's bibliography lists 10 studies of classification before 1962, most of them confined to 1 or 2 schools.

In a 1962 survey of the views of Auckland primary school teachers, Harris found that 81 per cent were prepared to adopt streaming as a classification system for teaching Standard 3 (9 year old) children. Most would carry this out on the basis of test scores on intelligence, reading and arithmetic, plus information from the previous teacher. The majority believed that streaming would raise attainment levels for pupils of both high and low ability, and would decrease the incidence of undesirable pupil behaviour, would cause children to work harder, and generally bring greater satisfaction to pupils, teachers and parents. In his national study of intermediate schools in the late 1950s Watson found that three-quarters of his sample of parents from four large school areas favoured ability grouping or streaming, while only four per cent were opposed. It is of interest to note that all except 2 of the 45 intermediate schools

studied were using some form of ability grouping at that time. In view of the recent changes in climate on this question it would be interesting to repeat these surveys with comparable samples of teachers and parents today.

More recently, Duncan studied the self-concepts of Form II (12 years old) pupils in 4 Auckland intermediate schools, to see whether they were affected by school policies on streaming. Boys showed consistently more positive concepts than girls, and pupils below average in achievement were less positive, but there were no significant differences between the self-concepts of pupils in streamed and non-streamed schools.

In the secondary schools she studied in her 1969 investigation of social classes, Cora Vellekoop claimed that streaming helps to perpetuate influences from the social class background, by segregation of students from different social classes in different streams. Whether this is an inevitable outcome would depend, no doubt, on the sensitivity with which the streaming was carried out.

Flynn and Munro, in an evaluation of science course in Forms III and IV, found that improvement in scientific skills was just as great in average classes as in high ability streamed classes, contrary to teachers' opinions. In the report of the Curriculum Review Group of the Post Primary Teachers' Association, **Education in Change**, chaired by Munro, the point is made that low ability pupils benefit most when first placed in mixed ability groups, but that high ability students learn by helping others, and by teaching themselves 'how to learn' when the teacher is occupied with the less able. Teachers in unstreamed classes are more likely to cater for individual differences, the report claims.

In a Waikato secondary school, where children were accustomed to streaming, Ken Rae investigated the hypothesis that the policy would have divisive effects amongst the pupils in different streams. Contrary to expectation, he found a high degree of agreement amonst high and low stream pupils in the preferred functions and styles of their teachers. In another secondary school in Wanganui, Wilson also found a high degree of consensus amongst pupils of different streams in their attitudes to school and its functions.

One small scale evaluation of partial non-streaming in a Hutt Valley high schol was undertaken by McCausland in 1972. Of nine third form classes, the top two were streamed by test and teacher assessment criteria, and the remainder redistributed randomly into seven non-streamed classes. Half-year examinations showed that the results of the non-streamed classes were higher than expected, and higher than one of the top stream classes in several subjects. McCausland noted, amongst other things, that streaming achieves very little homogeneity in most academic subjects, and that the expected complaints about the difficulty of teaching a wide range of ability did not eventuate. 'A top and tail appears to develop in most classes, whether they are streamed or not'.

In a follow-up study McCausland found that, by the end of the fourth form, the non-streamed classes were still performing at least as well as the streamed classes of the previous year on the same examinations, while those in the top streamed classes appeared to have dropped, by comparison.

While the limited amount of research undertaken in New Zealand has not produced much new knowledge on the effects of streaming, it is certainly consistent with the overseas findings that children in mixed ability groups would not be at a disadvantage when compared with streamed classes. In short, streaming as an educational polcy has not really proven itself.

## Conclusion

Clearly the last word has not been said on streaming, nor the last experiment conducted. In fact, the need for better local research on the issue is quite apparent. Nevertheless, the following conclusions seem warranted on the basis of the best research undertaken to date.

1. Streaming, as conventionally practised, has not been shown to be superior to non-streaming as a method of promoting pupil achievement. Most of the large scale, well controlled experiments show negligible differences in achievement, and where differences do occur, they more often favour pupils in non-streamed classes, particularly those of average or low ability.

2. The social and personality development of pupils is, with few exceptions, enhanced more by non-streamed classes. Pupils in such classes typically show healthier self-concepts, have more positive attitudes to school, and participate in more activities. Several researchers have pointed out that pupils in streamed classes leave school sooner, and that delinquent and other anti-social subcultures flourish more commonly in the low streams of such schools. There are many recent comments about improved discipline and morale in non-streamed schools. Against this is the occasional finding that slow pupils in mixed classes are more often socially isolated.

3. Streaming, **per se**, is less important in influencing pupils' development than the attitudes and practices of the teacher. School policies are, however, more amenable to change than teachers' habit. Children in mixed ability classes, taught by teachers who do not favour such a system, show very similar characteristics to children in streamed classes. Clearly the policy used must have the approval of the staff.

4. It is a fair criticism of experiments on streaming that participating teachers of streamed classes have rarely adjusted the content and rate of instruction to suit the differing needs of their pupils. In theory, streaming should allow appropriate goals to be set for each class, but too often, in the research studies, all streams have covered the same ground. Under these circumstances, one would not expect the advantages of streaming to become obvious.

5. On the other hand the differences in needs between streamed groups are not as great as is widely believed. The reduction in variability of achievement levels in streamed classes is typically less than 20 per cent. Moreover, many children are found to be misclassified, partly through changes in their rate of growth. 'Late bloomers', placed initially in low ability groups, find it harder

to catch up. And the research shows that the record of the schools in reclassifying such pupils is not good, either in England or New Zealand. Streaming has been too rigid, as if each initial placement were final and irrevocable.

6. Several smaller research studies show that a policy of streaming exerts a polarising effect on achievement levels in a school. The bright become brighter and the slow become slower. Certainly the correlation between pupils' pre-test and post-test scores is usually greater in streamed classes. A common interpretation of such findings is that low stream children are frequently taught by less experienced teachers. This situation is in marked contrast with that of the medical world, where the most difficult cases are assigned to the most highly skilled specialists.

7. There are strong sociological reasons for mixing the ability groups. If the school is to be a microcosm of society, then all ability levels should have the chance to mingle freely. The elitism which is allegedly promoted in streamed schools does not square easily with New Zealand social egalitarianism.

8. Those who have tried it agree that mixed ability teaching is more demanding for the teacher, particularly in mathematics and foreign language subjects, where the curriculum is sequential in nature. Work more often needs to be individualized, or differentiated according to in-class groupings. However, many teachers report that the strain becomes less with experience, that bright children frequently profit from learning independently, or helping the slower pupils, while the teacher can spend more time with those who need the most assistance. In this connection, the comments of a secondary school mathematics teacher in a school which has switched to non-streaming are relevant: 'Our experience has convinced us that mixed ability grouping is good, though I think that all of us would agree to it being much harder work than a streamed situation. We have been forced to examine our aims and our subject, and have involved ourselves in the writing of materials. We are now far more concerned with the individual mathematical development of children, rather than the assimilation of a set amount of mathematics during a specified period. We have very few discipline problems, perhaps because the children are interested, perhaps because of the degree of organization and preparation for lessons, or because we have not created a 'sink' group with all its attendant problems.. (H.M. Wilcox. p. 136)

## Summary

To stream or not to stream? The best research conducted to date shows no real advantages to pupils in streaming, and several important benefits in non-streaming. While the differences are small they are sufficiently consistent to warrant a close look at the teaching implications of non-streaming. Many New Zealand schools have switched over to partial or complete

non-streaming. Most teachers find that the grouping and individualization of instruction that is required is not easy, but it is being successfully practised in many mixed ability classrooms. What we need now is some controlled evaluation of its effects, not only on pupils' achievements, and attitudes, but also on teachers' work loads and levels of satisfaction, the management problem in the school, and the long-term sociological implications. These tasks may be difficult; but that is no excuse for not attempting them.

## References and Reading List


* Barker Lunn, J.C.,
**Streaming in the Primary School**, Slough, Bucks: NFER, 1970. Available in New Zealand from the Test and Book Sales Division, NZCER, P.O. Box 3237, Wellington. $15.05 (NZ).

* Beeby, C.E.,
**Intermediate Schools of New Zealand**, Wellington: NZCER, 1938.

Billett, R.D.,
**The Administration and Supervision of Homogeneous Grouping**, Columbus, Ohio: Ohio State University Press, 1932.

* Borg, W.R.,
**Ability Grouping in the Public Schools: A Field Study**, 2nd ed., Madison, Wisconsin: Dembar Educational Research Services, 1966.

* Bouri, J. and Barker Lunn, J.C.,
**Too Small to Stream. A Study of Grouping in Small Junior Schools**, Slough, Bucks: NFER, 1969. Available in New Zealand from the Test and Book Sales Division, NZCER, P.O. Box 3237, Wellington. $4.25 (NZ).

* Chanan, G.,
**Streaming and the Primary Teachers**, Windsor, Berks: NFER, 1970. Available in New Zealand from the Test and Book Sales Division, NZCER, P.O. Box 3237, Wellington. $1.95 (NZ).

* Curriculum Review Group, New Zealand Post-Primary Teachers' Association,
**Education in Change**, Auckland: Longman Paul, 1969.

Daniels, J.C.,
'The Effects of Streaming in the Primary School. 1: What Teachers Believe', **British Journal of Educational Psychology**, Vol. 31, Part 1, 1961.

Daniels, J.C.,
'The Effects of Streaming in the Primary School. 2: A Comparison between Streamed and Unstreamed Schools', **British Journal of Educational Psychology**, Vol. 31, Part 2, 1961.

Duncan, L.K.,
**The Effects of Streaming on the Reported Self-Concepts of Intermediate School Pupils**, MA Thesis, University of Auckland, 1974.

Ekstrom, R.,
'Experimental Studies of Homogeneous Grouping: A Critical Review', **School Review**, Vol. 69, No. 2, 1961.

* Ferri, E.,
**Streaming: Two Years Later**, Slough, Bucks: NFER, 1971. Available in New Zealand from the Test and Book Sales Division, NZCER, P.O. Box 3237, Wellington. $9.35 (NZ).

Flynn, H.E. and Munro, R.G.,
'Evaluation of a Curriculum', **British Journal of Educational Psychology**, Vol. 40, Part 3, 1970.

Goldberg, M.L. et al.,
**The Effect of Ability Grouping. A Comparative Study of Broad, Medium and Narrow Range**

**Classes in the Elementary School**, New York: Teachers College, Columbia University, 1962.

Goodlad, J.I.,
'Classroom Organisation', in **Encyclopedia of Educational Research**, edited C.W. Harris, 3rd ed., New York: Macmillan, 1960.

Harris, M.J.,
**Streaming in the Primary School**, Dip. Ed., University of Auckland, 1962.

* Institute of Education, University of Exeter,
**Teaching in Unstreamed Secondary Schools**, Exeter: Institute of Education, University of Exeter, 1967.

McCausland, F.J.,
**A Study of the Introduction and Effect of Partial Non-Streaming at Hutt Valley High School (Wellington) in 1971**, Dip. Ed. Admin., Victoria University, 1972.

* Morrison, C.M.,
**Ability Grouping and Mixed Ability Grouping in Secondary Schools**, Edinburgh: Scottish Council for Research in Education, 1976.

Orange, R.D.,
**Vertical Grouping in Secondary Day-Schools: United Kingdom Precedent and New Zealand Practice**, MA Thesis, University of Auckland, 1975.

Rae, K.A.,
**Streaming, Option Course Choices, and the Role of the Teacher**, Dip. Ed., Massey University, 1973.

* Ream, M.A.,
**Ability Grouping**, Washington, D.C.: Research Division, National Education Association, 1968.

* Seckington, R.,
**Mixed Ability Groups in Secondary Education**, Exeter: Institute of Education, University of Exeter, 1969.

* Svensson, N.E.,
**Ability Grouping and Scholastic Achievement: Report on a 5 Year Follow-Up Study in Stockholm,** Stockholm: Almquist and Wiksell, 1962. Abstract in **Educational Research**, Vol. 5, No. 1, 1962.

Vellekoop, C.,
'Streaming and Social Class', **Delta 5**, August 1969.

* Watson, J.E.,
**Intermediate Schooling in New Zealand**, Wellington: NZCER, 1964.

* Wilcox, P.,
'Mathematics' in **Mixed Ability Grouping. Possibilities and Experiences in the Secondary School**, edited R.P. Davies, London: Temple Smith, 1975.

Wilson, H.M.,
**A Study of Streaming**, Dip. Ed., Massey University, 1971.

* Yates, A. (ed.),
**Grouping in Education**, London: Wiley, 1966.

* Available NZCER library, P.O. Box 3237, Wellington. Copies of a selected list of references to articles and books dealing with streaming in the secondary school are also available from the same address.

Cover photograph by Derek Olphert

First issued in set 76 number two.
New Zealand Council for Educational Research