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ABSTRACT

This report presents the methodology and some of the results from part of an on-going Rand Corporation study of change agent programs sponsored by the U.S. Office of Education. It concentrates on staff development as a vehicle for change in schools. After a brief introduction, the methodology of the study is presented. The third section examines the initiation of various projects. Section four concerns implementation and is divided into, (a) project characteristics, and (b) organizational and personal characteristics. Section five deals with the impact and effect of the school on the project. The sixth section discusses the evidence of short-term behavioral change which could be attributed to the projects. The last two sections discuss the longer term outcomes which these projects may have--section seven focuses on what characteristics of the project were likely to be continued after the end of federal support, and section eight concentrates on whether the project was disseminated to other schools or districts. (PB)

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THE POLITICS OF STAFF DEVELOPMENT

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I. INTRODUCTION

In the recent past, it has been relatively easy to effect school reform through teacher turn-over and recruitment. As long as teacher mobility remained high, a principal could on replacing perhaps as much as one-fifth of the staff in any given year. By recruiting and hiring with careful attention to teacher characteristics, a majority of the school's staff could be replaced and the school itself could be substantially reformed within the space of a few short years.

But now and for the forseeable future, teacher mobility has been greatly constricted by the teacher surplus, the availability of maternity leaves, the need for multiple incomes per family, and the effects of unionization. In New York City, for example, a beginning teacher assigned to a given school can anticipate spending five to seven years in that school before accruing the seniority necessary even to request a transfer. The point is, that school reform must be accomplished with existing personnel. More than ever before, those who seek to change schools must change the people now working in the schools.

The euphemism for that is staff development and it must be one of the mainstay techniques of educational innovation in the future. This paper presents the methodology and some of the results from part of an on-going Rand Corporation study of Office of Education-sponsored change agent programs. The paper is based on the results from the field work, or case analysis phase of the Rand study and is concentrated on staff development as a vehicle for change in schools. The analysis and conclusions in the current paper are the result of a secondary analysis of the data and are the author's sole responsibility.[1]

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1. The interested reader is referred to the complete reports from the first year of the project. See especially, Peter W. Greenwood, Dale Mann, Milbrey Wallin McLaughlin, FEDERAL PROGRAMS SUPPORTING EDUCATIONAL CHANGE, Vol. III: THE PROCESS OF CHANGE (Santa Monica, Rand Corporation, R-1589/HEW, Dec. 1974). Other volumes relevant to the first year of the project are: R-1598/1-HEW, A MODEL OF EDUCATIONAL CHANGE, Vol I; R-1589/2-HEW, FACTORS AFFECTING CHANGE AGENT PROJECTS, Vol II; R-1589/3-HEW, THE FINDINGS IN REVIEW, Vol. IV; and R-1589/5-HEW, EXECUTIVE SUMMARY, Vol. V.

II. METHODOLOGY

The staff development team was bound by the study's general guidelines for data collection and analysis.[2] Thus, only deviations from the general methodology description given elsewhere need be noted. A factor list for case descriptions was developed to guide data collection on project features that were thought to be important variables in staff development. Trainees, for example, were described by demography, experience, recruitment, selection, amount of participation, timing of participation, extent and amount of expected change and so on. (Those factors which turned out to be most clearly related to successful projects are discussed below.)

The trainers were described according to their demographic match with the trainee population, their position inside or outside the organizational site of the training, their participation in the control of the project and so on.

Factors related to the training methods included: the format or procedure used (lecture, discussion group, etc.); duration; functional area of the skill to be developed; the number of skills to be developed; and, the degree of integration between the training experience and the trainees' work experience.

The projects chosen for the field study varied along most of the above dimensions. They were located in all parts of the country and in communities ranging from a rural hamlet to a core city megalopolis. (Additional project descriptions are available below.) The field team conducted 50 to 100 interviews in each place visited. The number of schools visited in each place varied from 5 to 20. Our interviews ordinarily began at the top of the system and followed the project down through the administrative hierarchy to the teachers in the various schools. Interviews ranged from 45 minutes to 2 hours and were sometimes repeated to verify important points.

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2. See the companion paper prepared for this symposium, Dale Mann, "An Introduction to the Rand Corporation's Study of the Change Agent Programs Sponsored by the U.S. Office of Education," AERA, March 31, 1975, Washington, D.C.

It is reasonable to wonder whether a valid picture of staff development change-agent projects can be developed in the space of an 8 or 10 person-day field visit. In response to the question, it is relevant but hardly sufficient to point out that the staff development research team had logged visits to more than 400 schools for purposes of qualitative research. In addition, the team's observations were guided by the project's overall research protocols and by special materials for this topic. Those materials were based on an extensive survey of the literature of planned change and a thorough reconceptualization of that topic as it applied to schools. From that work, there emerged a series of preliminary hypotheses and propositions to be explored in this part of the fieldwork. Finally, all staff development cases were returned to the project directors in draft form for their comments. The interaction which resulted was sometimes painful but almost always helpful in correcting and even extending matters of fact, emphasis, and interpretation. The majority of those people most intimately familiar with the projects - that is their directors - found the cases to be useful representations and interpretations of their experiences. None questioned their factual accuracy. Thus, we have a considerable degree of confidence in the data on which these findings have been based.

Still, it should be recognized that we are dealing with data which is almost clinical in nature. Implementation, adaptation, subtle modifications over time, and the other phenomena we sought to document would have been extremely difficult to capture with techniques appropriate to a larger sample. Additionally, we found that project titles sometimes bore little or no relation to the on-site activities, the quality of evidence available from evaluations varied wildly, and there was practically no documentation of school site or delivery level effects. Finally of course, there was the problem of how to distribute scarce analytic resources given the foregoing realities. Thus, the generalizations in this paper are based on an intensive examination of five sites through the procedures described above. (Since the extensive survey-data based phase and the intensive case analysis phase overlapped in some significant areas, the Rand project will offer an interesting opportunity to compare the utility of the two techniques.)

This paper concentrates on describing a process of mutual adaptation, implementation, and changes which has been

generalized from the data. It uses illustrations as often as possible but necessarily concentrates on a process description, not on the description of multiple contexts. The reader is invited to compare the evidence of this paper with his or her own experience and with the case materials themselves.[3]

III. INITIATION

Why and how did the projects begin? Where did the idea come from? How much support was necessary from how many people?

The literature on planned change stresses the importance of a high level of felt need to change. The idea occurs in two different forms: (1) The "goal seeking" or "rational" model in which the impetus for change comes from an intention to move from existing patterns to desired future states; and (2) a "problem solving" orientation in which dissatisfaction with current situations prompts construction of a definitive remedy. None of our staff development projects were initiated in response to a widespread and significant felt need to change. In fact, it was always assumed that the objects of the project's efforts, those people who were to be "developed" (changed) would resist that effort, deny the project's utility, and otherwise be obstacles to change. Most projects came into being because of a small nucleus or cell of individuals who operated independently of or in opposition to the wishes of district superordinates and the trainee group as well.

The "goal-seeking" or "rational" model explained very little about these projects' initiation. Most school districts

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3. The complete staff development cases are available in Appendix A of Greenwood, Mann, McLaughlin, FEDERAL PROGRAMS SUPPORTING EDUCATIONAL CHANGE.

store their needs in a bottomless pit. When outside money from any source and for virtually any purpose appears to be available, the district fishes around in the pit until it finds the need that matches the announced purposes of the soft money. That need is then elevated to the status of a priority in order to demonstrate the district's commitment, and not incidentally in order to capture funds. The process is exactly why so many districts object to having their programs jerked in so many different directions by program specific, rather than general or bloc assistance. The point here is that the process invalidates the central tenet of a goal seeking model of change. From the point of view of the Federal government, the opportunism evident in this process is probably a useful characteristic since it demonstrates district responsiveness (at least initially) to a Federal agenda.

Because it is less grand, "problem solving" seems to be a slightly more accurate characterization of the motives for initiation. But the "problem solving" approach we saw was one in which districts moved not so much toward any carefully conceptualized future, as away from what ever problems were most pressing and which could be ameliorated (note, not "solved") by someone else's money.*

The planning activity is also a noticeable departure from the synoptic rational model. If the practice of searching for alternatives implies the conscious generation of the different options available in some universe of potential solutions prior to initiationg the project, then there simply was no such search. The alternatives that did get considered more were those that were immanent in the experience or education of the small group of project initiators. The "linkage" to universities, other schools, or R and D institutions was not a heavily travelled path. (Although alternatives were noticeable by their absence at the project's initiation, the entire process of modification and mutual influence between the project and the site in the implementation stage can be considered a search for alternatives.)

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* Since we were looking only at places with Federally supported projects, it is obvious that those places were using someone else's money. Clearly there are other, indigenous problem solving efforts -- reorganizing, program redirection, new program starts and so on.

Planning as a programming or scheduling activity might have been provoked by the proposal writing requirements for Federal grants. We did find extensive planning to be related to the success of the projects, but the explanation for that lay not in the intrinsic value of the planning activity but in the fact that the most successful projects were also the most ambitious, complicated and thus demanding of good planning. In all cases, proposal writing was regarded as a vaguely distasteful grantmanship necessity which no one took very seriously.

Since most districts now recognize that they can with impunity take virtually any amount of someone else's money to try to do virtually any task, they regard the proposal process with extreme fatalism. The more important point here has to do with the impossibility of making a prior specification of the career of an untested intervention in a complex and unknown behavioral system. In only rare (and uninteresting) circumstances can there be a behaviorally adequate prior specification of the sort necessary to support detailed planning (and the subsequent accountability for the realization of that plan.) Two important consequences follow. In most districts the possibility of good planning is prematurely deprecated; second, because of cynicism, people fall far short of the achievements they might otherwise realize.

Widespread planning participation is supposed to be useful but was only tried in one case where the OD stress on autochthonous change clearly and persistently subordinated any other behavioral change to the attitudinal breakthrough which was thought to be a necessary precursor to all else. Thus, all the trainees' planned what, if anything they wanted to happen to themselves. The fact that two of the project's three years had been consumed while the population alleged to be in need of training decided first how it felt about that and second what was to be done about that was justified by reference to the truth-trust sine qua non of significant (OD) behavioral change. As noted above, many projects were run by small, almost conspiratorial cells of people who were working to replace the status quo. Increased decisional participation would have invited foxes into the chicken coop.

The best summary characterization of the initiation process in these cases was (a) the recognition of some outside resources which might (b) be applied to an emergent generalized need for change in someone else's behavior as determined by a small group of middle-level people, who then (c) plunged into the first project treatment that satisficed them and the funding agency.

Selection of the target group was ordinarily done at the same moment and by the same people that determined the "idea" or need for change itself. That is, most ideas seemed to have occurred in terms of the need to change (some group's) behavior. It should be noted that specifying the target group and identifying those individuals within the group to be trained are two distinctly different activities. In no case did target groups select themselves as the needed focus of change. In fact, there was very little evidence of either support or opposition from the trainee population at the initiation stage of the project. In general, they were unaware of what was to happen to them, or if they knew of the projects' existence, its goals were stated in such softy-lofty terms that no one could object. Those projects with more precise purposes pointed more directly at identifiable groups were also more likely to encounter the early opposition of those groups. As trainee identity increased in terms of specialization (e.g., high school math teachers, special ed curriculum developers, etc.) that identity gave rise to opposition.

IV. IMPLEMENTATION

Part A: Project Characteristics

Several interesting features about the goals of staff development projects are most clearly on display in the implementation stage. Implementation begins when the project settles down to the hard work of trying to influence teacher behavior. But the vast majority of teachers believe in what they are already doing, not in what some newly-arrived change-agent project might want them to do. Those convictions may not be very firmly held or clearly displayed, but the teachers own professional behavior is still a basic point of orientation. That reality created a dilemma for all projects. The prior, public identification of the group whose behavior was to be changed was very likely to increase the resistance of that group to the project's efforts. The more in need of change was the group, the more important it was that they not be invidiously labeled.* Thus, most projects used public goals that were more than usually amorphous. The vagueness of the goal sets was compounded by the irony that many of the outcomes of staff development were difficult to state in behavioral terms susceptible to measurement.

We also sought to document how far the project's goals diverged from those of the district. On the face of it, a set of operational goals at odds with those of the larger district is not such an outrageous expectation for a change-oriented activity. We found instead a strong need for protective coloration. To survive, it was generally important to encourage people to believe that the project represented only a relatively small change in their existing practices. Schools are continuing organizations and their

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*This holds only for models of cooperative and semi-cooperative change. Where conflict is to be the engine of change, prior labeling may very well be a good tactic to get the target group's attention. Many people deny the possibility of any change in education except through the cooperative route. On the basis of these cases, that attitude seems as much a description of the problem as a valid conclusion. The purpose of public policy remains the regular achievement of public goods...under any circumstances but especially in instances of conflict or disagreement which are after all the most significant environment for public policy.

pre-project methods represent distributions of benefits and power and are thus the objects of fierce loyalty. Although to the outsider, pre-existing goals may seem to be meaningless generalities, they have very frequently been the focus of bitter conflict, painfully resolved. A direct challenge to those goals might lose the change-agent challenger even the chance to try by destroying access and by mobilizing the opposition. The notion of change as an organizational summum bonum, which is held in such esteem by various non-LEA levels is in fact a kiss-of-death handicap in many districts. And since many of those same districts are the most in need of change, the committed change-agent is presented with an interesting choice between candor and effectiveness. Second, change often means more work and more uncertainty - two things most teachers and other people strive to avoid. By relating project goals to what exists, the trainees' perceptions of the anticipated work necessary to incorporate the change and the uncertainty associated with it could both be reduced. For these reasons, most projects pretended that their goals had been founded on pre-existing larger system goals, although they were not.

The "real" or operational set of goals is more difficult to analyze partly because they are more subtly stated. In the most successful projects, the goals of those projects were dramatically at odds with those of their parent systems. In one case the school board was legislating the length and flexibility of paddles with which the students could be punished, while the project was trying to move its teacher trainees from material to symbolic reinforcements of student behavior. In another case, while the project was trying to individualize instruction, the board was mandating a single district-wide lesson plan.

Where the goals of the project included attention to strongly held cultural values (attitudes about race, ethnic pluralism, student responsibilities) the projects tended to concentrate on the supposedly more neutral and technical aspects of pedagogy and consistently avoided engaging controversies. Thus projects that started out to deal with race ended up working on instructional techniques.

The amount of change attempted is another goal-related characteristic. Even though they could not broadcast their intentions, the best projects set out to make a big difference, to help people to depart substantially and radically from their previous patterns. Less successful projects contributed more to organizational maintenance than

to organizational change. Big change aspirations are probably functional because they provide their participants with early motivation and commitment and because when the inevitable compromises come (see "Adaptation" below) ambitious projects can still salvage a reputable and significant portion of their purposes.

A second measure of the ambition of a project is the extent of its intended changes. This refers to the portion of a school site or "critical mass" which must be affected before the implementation can actually take hold. Here the strong social sanctions of the school as a small band of professionals exerted itself very strongly. An occasional maverick could buck those sanctions and implement the changed behavior in isolation. But the much more common pattern was for the school to single out rate-busters and to deprecate or ostracize them until they regressed to the mean. It should be remembered that change is an indictment of existing practice and of existing practitioners: in its field reality, it is not a state devoutly to be sought, nor is it a clinical, bloodless, consensual process. It was resisted by teachers who were threatened by it. For these reasons, it was important to succeed with enough of a school building's staff to provide a potentially self-contained unit. Allowing for defections, backsliding, and partial implementation, that usually meant not fewer than 20-25% of the school's staff had to be successfully trained with project's techniques.

The first aspect of the project treatment itself is the complexity of the design. Complexity was not related to size. We saw very, very simple projects that were enormously costly; one project amounted to not much more than a lot of project personnel doing the same things that they wanted teachers to do. It was both the least complex and the least successful. For one thing, no one had thought through the complicated problems entailed in behavioral change in that metropolitan, central-city district. Or, if they had, they despaired of accomplishing anything and got overwhelmed by the virulent situational factors for which the site is famous. On the other hand, one of the most successful projects was fabulously and endlessly complicated - a sort of educational Gaudi design. This is a curious finding since the probability of successful implementatin would seem to go down as the number of necessary precursor contingencies goes up. Yet the most successful projects relied on various inputs, the availability of different sorts of actor attitudes, long chains of changes and events, and so on. The message may be that no lesser sort of

effort will suffice and the risks of complexity are a necessary concomitant to success.

The most successful projects developed their own materials. The quality of the materials seemed not to make as much difference as the fact that they had been tailored to the site by project staff. Indigenous development had a number of important benefits. For one, locally developed curriculum can counteract the parochiality of teachers, most of whom believe that no one else can possibly know anything of their situations. This probably enhances the chances that the project's treatments are pointed at problems which its trainees feel are significant. A more important benefit had to do with the personal investment and thus also the commitment represented in self-developed material. When the trainers wrote their own guides and curricula, they knew it better and believed in it more than if they had simply adopted pre-existing materials.

Successful materials were those which offered a number of alternate points of entry (e.g., classroom physical organization, child self-concept, diagnostic procedures, etc.) so that teachers could begin wherever they felt they needed help. That is related to another important characteristic -- the opportunity for early success. Praise, material rewards, changed student performance, or even self-satisfaction were provided early. Some projects offered money rewards for completing units of training; others provided released time. The availability of material rewards was not a significant incentive for teachers to start the training, but it was a useful reinforcement to continue it.

In an area where graduate training is notorious for the level of its standards, it is interesting to note that three of the projects incorporated tough-minded evaluation of what the trainees had or had not acquired. One project was especially active in that regard. Failure to pass a component competence examination was a relatively frequent experience, but rather than being discouraged, the trainees seemed to feel that it contributed credibility to the training experience and distinguished it from many of the demeaning "Mickey Mouse" institutes and workshops to which they had been exposed.

The extent of "packaging" was also related to the success of the training experience. At the one extreme, a completely "unpackaged" project sent teacher trainers out to work rather spontaneously on their trainee's classroom problems. Unfortunately, the change efforts then got linked tightly to the presence of the trainers. At the other extreme, a training staff stayed largely in one place, preparing kits and auto-

instructional packages which they then mailed to their clients.

The most powerful program had the following characteristics:

(1) The simple availability, over time, of the training staff as a source of help on the trainees' demand and on the trainees' problems. This reduced the teachers' apprehension that change projects meant more unrealistic work for them.

(2) The provision of a demonstration lesson done by the trainer with the trainees' classes but with no participation or responsibility on the part of the trainee. That helped establish the trainer's credibility and the treatment's feasibility.

(3) Provision of multi-media, multi-topic, self-paced, auto-instructional teaching packages for the trainee's independent use. It should be kept in mind that many teachers do not like to read.

(4) The credible, non-invidious, independent evaluation of individual progress at relatively frequent intervals by people outside the teachers' school-based chain of command and unrelated to the teacher's "official," permanent-record performance evaluation. Only one project was able with impunity to build the principal's participation into the teacher's evaluation. Needless to say, that place did not have a union or even a strong teachers association.

The most successful projects were managed by a "cell" of individuals somewhat isolated from the rest of the system. Given the seriousness with which they took their task to change (i.e., challenge) that system, and given the power of the rest of the organization, that isolation seemed prudent.

On the other hand, projects that aspired to teacher change must deal with the teacher's boss - the principal. The projects which achieved the least of their own change-oriented agendas did so in large part because building principals re-directed or subverted project efforts once they reached the school building level. Most building principals were not in favor of the staff development efforts at least in part because such projects challenge the principal's traditional role as the instructional leader, master teacher, or chief teacher trainer in the school. Second, the project was almost bound to try to move teachers away from practices

already sanctioned by the responsible head of the school, the principal. Few principals opposed the initiation of projects, but many opposed project efforts once they had crossed the school's threshhold. Two projects tried to do an end run around the principals to the teachers. In one case it succeeded if only because of the passivity and unsophistication of that group of principals. In the other case, the principals lost a few of the early battles and then won the war with a sort of scorched earth strategy directed against project personnel.

Resource allocation patterns attested to the power of the principals. Where project resources were made available to principals for use at their own discretion they were largely used to maintain and buttress the status quo (cover ordinary classes, act as substitutes, etc.). Where resource allocation remained in project hands, project purposes were better served and where, because of political opposition from the principals, they could not be served at least the project staff was able to negotiate the terms of certain compromises.

The criteria for resource allocation within projects are about what might be expected. Project goals did not completely govern but did so in combination with other criteria such as (a) the prior social access of the training staff to trainees, (b) the accessibility of grade levels to treatment, (c) the demands of a particular treatment, (d) state law, and - in all cases (e) purely situational, idiosyncratic, largely uncontrolled, and largely unanticipated factors.

Planning seems to be directly related to success. The projects which had achieved the most could also communicate where they were going and how they hoped to get there. They also had the decision-assisting technology to back that vision. The phenomenon seemed to be much more than simply the presence of good management mechanisms: it reflected the active and positive orientation to the events and contingencies that buffeted all of the projects. Some drifted and no one cared very much; others worked hard to achieve what they set out to do.

Evaluation in the sense of informal but serious stock taking by project staff and district clientele was an important activity in the most successful projects. They paid attention to it and they changed because of it. Evaluation in the sense of formal project assessment for the state and Federal grantors was done to continue to qualify for money, not for its utility to project management.

Trainee Characteristics

The people to be developed strongly influenced the success or failure of the projects. The clearest relationship between any trainee characteristic and project success had to do with the grade level of the teacher. The higher the grade level, the more resistant to training was the teacher. The effect was so clear that no project examined was able to have any impact on a high school. A number of things about high schools seemed to be at work here.

- The high school curriculum is topically organized with teachers who relate to their topical fields more than to an overall schooling mission. They are ordinarily more oriented to substantive concerns than to process concerns. While most change projects emphasized process, high school teachers consistently subordinated process considerations to topic coverage.

- Topic specialization provides a source of identity and an organizing base which makes high school teachers believe themselves to be superior to their lower grade colleagues. That specialization strengthens defenses against outsiders and makes resistance to change easier and more effective.

- High school faculties are often already split into antagonistic groups of "core", "solids" or "academic" teachers and "electives" teachers. The lack of cooperation between those factions makes things like scheduling changes and team teaching very difficult to realize. The teachers believe in the compartments that they have locked themselves into. Norms of local unanimity further freeze this situation. (One group's cohesively expressed desires will not be interfered with by another group.)

- The baby boom has not yet ebbed in the high schools which remain relatively overcrowded thus affording teachers there less free time and organizational slack than is currently available in lower grades.

- High school teachers deal more briefly with many more and older students and thus tend to blame the anonymous mass of threatening students more than themselves for the failure of schooling. That diminishes the sense of personal responsibility and thus the felt need to change.

°Students who fail or who are failed by the high school simply go away and are not persistent problems within the same organization. That too diminishes the felt need for change.

°Because high schools are larger and more specialized with more intermediate organizational layers, high school teachers are less dependent on their principals than are elementary school teachers and thus more difficult to influence through the chain of command.

°High school faculties are usually more unionized than elementary colleagues and thus less malleable with respect to "extra" demands of training programs.

°There is far less parent and community pressure on high schools than on other levels of schooling.

°Because their content specialization gives them greater mobility; high school teachers have more options. Thus fewer high school teachers move into the central office non-school career middle management posts from which special projects are often staffed. That reduces the number of school "hands" on training projects and makes access back to the high schools that much harder.

The other strong relationship in the area of trainee characteristics had to do with the way in which they joined the project. Most projects devoted most of their resources and had most of their impact on people who volunteered for the training. There are several reasons for this volunteer focus. By definition, volunteers are easier to attract into the project and easier to train than are their more recalcitrant colleagues. They tend to be the "friends and neighbors" of the project staff members; thus, as a more congenial group sharing many assumptions, the initial training is easier to conduct and moves faster. Since most projects had been designed with the hope of working effectively with a more difficult population, the early successes with the volunteers are gratifying, especially so for the people who are uncertain about the sufficiency and reception of their techniques and who need early successes to justify their further efforts. In addition, special projects which are untried and struggling for credibility and support, seldom have the political clout to require participation. Often the premises of the training

techniques (OD, for example) make it inappropriate to force participation. The teachers' organizations, their regular responsibilities, and their professional status usually are sufficient protection from such mandates anyway. Thus, the focus on a training population of volunteers.

Unfortunately, that early concentration on volunteers had some deleterious effects. First, it misled trainers about what to expect. Second, it often encouraged them to modify their training agenda based on experiences with volunteers which then did not work at all when (or if) the project took on a non-volunteer audience. Third, it created obligations and expectations for continued service which subtly steered the project's resources toward the most receptive audiences -- the volunteers. But, since most volunteers already agree with the project's premises and are eager for its treatment (why else volunteer?) the result was to allocate the most resources where they were least needed. Where they tried to affect high schools at all, for example, projects did so only in their last year of existence, after they had saturated the more malleable trainee groups. An additional effect comes from the successful training of volunteers. Since they usually learn quickly, and well, the volunteer-trainees returned to their schools as true believers searching for converts. Schools are in many ways like the army and in both places anyone who volunteers for anything is regarded as peculiar, if not a little touched. The enthusiasm of those newly-trained volunteers convinced many of their unreconstructed peers that the project was for radicals and other eccentrics. Thus, some training staffs got a distorted reputation and diminished their chances of building bridges to the larger group, more in need of the training. The whole sequence is as understandable as it is serious in its impact on program direction and success.

The extent to which trainees perceived the need for their own (further) development is an important but complicated characteristic. Certainly that perceived need facilitated acceptance of treatment and enhanced the chance of success. But where was it to come from? Where projects were initiated because of particular crisis (racial outbursts, rampant drug abuse) the perceived need often related only to that crisis and not to underlying causes. But, when the crisis was resolved the impetus for change disappeared. One project made a concerted effort to create crises in order to get the attention of people who believed themselves to be working within a largely healthy organization. The tactic was not successful.

The matter of a perceived need seems to be related to the role area implicated by the training. Successful projects managed to convince their populations that the training was relevant to a central role area but not so important as to be threatening or overwhelming. Trainees needed to see that they were being asked to make small changes related to big goals. Creating that perceived need was an extremely delicate business. The next question is, what should be done in its absence? Once the projects had exhausted its pool of volunteers, the rest of the potential trainee population was likely to feel that they were doing OK without the project. The vivid shift that occurred in this single behavioral characteristic -- from those who wanted the project's treatment to those who didn't -- would seem to dictate two distinctly different training techniques, yet no projects made an adequate response to that shift.

The defensive characteristics of the non-volunteer audience need some explanation. As a whole, teachers are relatively insecure individuals who must try to perform virtually impossible tasks with a technology which is inadequate or simply wrong. Defensiveness and secretiveness are understandable attitudes where the circumstances demand a professional, pedagogical role performance even though there is no sufficient knowledge about what causes good teaching and learning. Finally, because teachers recognize that they are supposed to perform intellectual tasks, and because their intellect is clearly on display in most kinds of professional interaction (especially in training sessions) the safest performance is the least performance. Thus, to guard themselves from negative evaluation, they simply clammed up. It is hard to train clams.

Another question deals with the reinforcement of the trainees' behavior as opposed to the redirection of it. Most of the teachers who enacted most of the training said that they had already been doing a version of the new behavior, that the project only added to what they had learned elsewhere, and so on. Part of this was certainly self-protection (the stigma of "not knowing" is very strong among quasi-professionals) but it is also an indication of where training may be the most efficient. Still, it should be noted that the group most in need of the project's resources is not the group already moving in that direction but the much larger group at a dead standstill. Although some projects came closer than others, no project seemed able to marshall all of the requirements necessary to effective engagement with that status quo majority.

The one bright spot in this dark picture is the hidden effect which many projects have on that resistant majority. We found some evidence (discussed elsewhere) that resistant teachers nonetheless did modify parts of their behavior although their personal needs were such that they had to deny that they had done so. Thus, "crying 'never', they did."

There is a lot of debate in the literature about the heterophilous/homophilous nature of the trainers in relation to the trainees. The most successful trainers we encountered were those who had paid their dues in the instant client system but who were at some emotional and professional distance from it. The most effective trainers seemed naively enthusiastic and maintained that enthusiasm in the face of reality. Thus they had inside knowledge and surface credibility, plus a critical attitude and some protection from the consequences of that attitude.

Many projects used outside consultants in an attempt to get that critical attitude and the freedom to act on it. All four of the projects which employed outside consultants to train teachers dropped them after the first year. They were simply not credible enough, responsive enough, or available enough to get through.

Part B. Organizational and Personal Characteristics

The project's location in relation to the bureaucracy of the schools was an important characteristic. In one place, those people working to change the larger organization tried to avoid a "project mentality." They believed that their credibility would be damaged if people could discount them as a short-lived hot-house effort with no real responsibilty or staying power. In most of our cases, however, the integrity and partial isolation of the project-cell seemed useful.

The school sites, especially the building principals, exerted an enormous influence on project decisions. Changing staff behavior means changing it away from patterns which have at least the implicit sanction of, and which are the formal responsibility of the school's principal. In addition, teachers depend for many critical things on their principals (desirable teaching assignments, free time, scheduling cooperation, materials and supplies, promotions, protection from parents and other "outsiders," approbation, and exemption from scores of harrassing, petty regulations). Where the principal refused to allow carpet squares in a teacher's classroom (they were alleged to "breed vermin") or where the principal could reduce a teacher to tears in front of her colleagues for allowing "noise" (children talking to other children) or where a principal could dump all of the school's behavior problems on a teacher as a reward for her newly acquired teaching skills in the area of learning disability -- then teachers thought very carefully about their principal's reaction. The training project and staff were temporary phenomena; eventually the teacher would be left to make peace with the school's permanent authority. This anticipated reaction among the training population was central to the success or failure of projects and it gave every principal a built-in avenue to determining the teachers' responses to the development effort.

Thus, every project identified the system's principals as a critical force. How the project dealt with that force -- and how the principals dealt with the project -- was extremely important. Only one project even attempted to buck the principals, entering schools and conducting training sessions on the authority of the superintendent -- a practice that lasted only until the principals association forced the board to rescind the superintendent's authority!

A far more common pattern is that in which the project announced the district-wide availability of its services in tones of muted assertiveness, but when the trainers crossed the school's threshold they worked with teachers identified by the principal and on problems identified by the principal and with the success determined by the principal.

More happily but less frequently, principals sometimes exercised plenary power to reinforce the project. But, since change is almost necessarily a challenge to authority, not many of the school's duly constituted authorities were included to encourage that challenge. In those few cases where they did, the changes were as swift and dramatic as the sort envisioned in a proposal writer's fondest dream.

The process of changing teachers is a sensitive and volatile business often characterized by resentment, hostility, and resistance on the part of professionals who don't feel the need to change. Confrontation was an unpleasant business for the training staff. Moreover, they seldom had the confidence in their own techniques or the authority to assert themselves unilaterally with populations they might choose. Finally, much of the orthodoxy of training procedures stresses working only with volunteers. Consequently, despite the proposal specifications, most training staffs worked most with people they knew already or who shared their own characteristics. Thus, if the training staff was largely from elementary schools, the high school never received any training; if the project director had been a headquarters curriculum specialist, most project contacts with the school were mediated by grade level leaders; and so on. The fact of the matter is that it was easier, less threatening and perhaps more successful to recruit trainees from among one's former associates. The informal communications networks thus definitively steered the application of the project treatment.

We were interested in the effects which project experience might have on the capacity of these districts to innovate and on their propensity to take risks. No clear effects emerged perhaps because most districts welcome soft money for practically any purpose. They have become quite sophisticated about projects, their benefits, and their consequences. Only one project resulted in a net decline in the organization's capacity to innovate. The staff development effort was a very complicated, comprehensive, ambitious and aggressive effort undertaken in a very conservative large city district. The

The horror felt there by the forces of tradition about project activities galvanized them to action. Demotions, dismantlement and reorganization decimated the project staff and demoralized anyone foolish enough to try something new in that district in the foreseeable future. Two others of our case study districts will probably continue to attract soft money and to do as little as possible with it. None of this seems very likely to have an effect on risk-taking propensity. Districts do not make hyper-rational decisions and thus they do not base their initiations decision on probability calculations. Moreover, new people do still pop up and since they never know much about what's been done before them, they will probably try again even where history is against them.

Few effects came through more clearly than the salutary consequences of personal commitment on these projects. Where the staff believed in what they were doing, the projects had a much greater chance to flourish. Could project features themselves encourage that commitment? The most useful incentive seems to have been the visibility or mobility of project personnel. The most successful projects were run by people who reported changes in their careers prospects while the less successful projects were run by people who were comfortably resigned to falling back to classroom teaching at the project's conclusion. The explanation for this is probably related to the animosity which vigorous change attempts engendered. Successful people needed a way to escape from the district and were glad to have it; less successful people could easily sink back into the organizations which they had never challenged.

In line with that, increased responsibility and intrinsic satisfactions probably had a substantial impact on good projects, but money, credentials, and promotion did not, nor were they sufficient to produce the commitment necessary to success.

The only possible correlation between project success and the educational background of the project's administration dealt with recency of training and level of training as compared to that of the project's clientele. Project leaders tended to have had recent experiences with graduate school which seems to have armed them with some ideas which they then tried to employ. They also seemed to have more academic credentials than their immediate superiors or than their clientele. There is a sense in which this education may have provided the project's leadership with training relevant to the conduct of the project.

Certainly those projects which provided more training and guidance from the leadership level down to the actual trainer level were more successful than those which didn't.

Age, sex, tenure, previous position, amount of salary from project funds, promotions, and percent of time devoted to project activities did not make much of a difference. Ambition was related to success (although responses here may have tapped only the individual's felt need to move to another district after having survived the change attempt). Similarly, good projects seemed to be run by people who were more career-bound than place-bound.

V. ADAPTATIONS

This category of the process deals with the impact of the school on the project. It was a key area for the Rand field study since we had hypothesized that a great deal of the reported outcomes (and especially short falls) of change agent projects could be attributed to the school's transmogrification of the projects which were supposed to have changed the school.

All projects displayed a clear and similar pattern of adaptations. With the passage of time they: (a) became less ambitious about the system-wide effects they sought; (b) simplified their treatments; (c) slowed the pace of their activities; (d) decreased the amount of changed behavior expected from any individual; and (e) decreased their expectations about how many people within a site could be changed.

Three of the projects examined initially intended to retrain teachers at all levels of their systems, K through 12. All three began with a focus on the elementary school teacher population and then never succeeded in coming to grips with the high schools. It seems clear from all of the cases that the high schools are special and present peculiar obstacles to change agent programs which have already been discussed. Because of subject matter specialization and the loyalties and organizing patterns which follow from that, high school teachers can and do successfully resist change. Other factors that strengthen the autonomy of high school teachers (and thus reduce their availability to training) are the pressures of the job, union ties, student drop-outs -- the high school's failures exit -- and the faculty's relatively greater career mobility. The combined weight of those factors seems to account for the most dramatically simplification encountered in these projects -- the omission of any serious attempt to affect one entire organizational level of schooling.

Ordinarily, a project starts out with a very ambitious agenda of change, in part in order to capture funds. But after the original funding has been secured, there is a switch to the need to justify continued funding and that means demonstrating success with much more discrete, measurable phenomena than those in the original agenda. Unfortunately, the measured phenomena although superficially precise are only a small and usually not very important fragment of the project's goals. One project that began as a total curriculum revolution has its most successful and widespread implementation in the teaching of spelling.

A similar phenomenon operates to reduce the risk involved in a project. Broad and sincere attempts to change organizations and people encounter lots of vivid resistance. Resisting the

resistance burns up the project's capital. When people begin to appreciate how slow and costly change is anyway, they often scale their goals down to match the available resources. Thus projects which had started out to end illiteracy ended up trying to teach any kids just a little bit. Projects that had tried for individualized instruction satisfied themselves to have achieved differentiated small(er) group interaction. Problem solving gives way to remediation. Revolution gives way to reform.

Similar processes operated to simplify the project treatment. The panoply of services and activities and the sequences of phrases and events which characterized many proposals and the initial implementation of projects got diluted as they were transferred from the project leadership to the training staff to the trainees. In one project, for example, a consulting firm which specialized in OD interventions tried to communicate that technology in capsule form to a group of teachers who were then actually to conduct the interventions in their home schools. The result was that one group (the consultants) had all the technology and no responsibility while the teachers had only a little technology and all the responsibility. Consequently, the teachers only employed the simplest and "safest" of the techniques which they had been taught.

The training audience also acts to prune the treatment. The real world knocks a lot of the edges off the ivory tower original conceptualizations on the grounds that they are simply not practical. Thus, some project materials got cut by half, the amount of collateral reading was reduced, the length of training exposure was shortened, etc.

A related phenomenon has to do with the fact that sufficient behavioral intervention is a time-consuming process which, because it is so costly, can only be made available to a relatively small group of people. But where the project was viewed as a benefit or "goodie" to be distributed, there was often pressure to make that benefit available to as many people as possible. Thus, in order to spread the benefit over more people (and not incidentally, to build a base of political support) the treatment was thinned and applied to more people, but with less effect on any given person. Similarly, had we ever found a high demand for services, that project might have been tempted to reduce its treatment so that more people could profit by it.

Treatments also got simplified by being captured. Trainers arriving at the school with an elaborate training routine often discovered that the principal or the teacher-clients had other ideas about how the project staff should be used. The training materials then got bent to the needs of the local situation or simplified in order to accommodate both the project and site agendas.

The next adaptation that most projects experienced had to do with the pace of project activities. Most projects were planned with a client group of the system's most resistant trainees in mind. Thus elaborate treatments were specified but when, as most did, the project opened for business with an audience of volunteers, the training had grossly underestimated the receptivity of that group. Thus, the initial experiences went very well. Then the project began to tackle trainees from increasingly more resistant strata of the population. That clientele change really clamped the brakes on and the pace of change slowed dramatically.

Other things which retarded projects were the loss of the initial enthusiasm, the disillusionment about the amount of forced change or pushing which was feasible, the inevitable logistic and production foul-ups, and the gathering forces of opposition. All projects were immersed in a local political and situational context which could not be escaped or ignored. The fact that newly constructed buildings don't open on time or that unions have jurisdictional disputes, or that community groups misinterpret or oppose the project, etc., was simply a fact of life which had to be dealt with.

Two other things are relevant here. Where projects succeeded, that early success sometimes dampened the perceived need for additional change and slowed further work. And, sometimes, the problem that had provided the initial motivation simply changed. In one case, for example, the drug abuse prevention aspects of a project got vitiated when the wily high school students suddenly switched from abusing drugs to abusing alcohol.

Two other reductions occurred involving the project's goals vis-a-vis individuals. First the amount of change expected of any given individual got reduced from an expected total transformation or behavioral reorientation to just, some change -- however modest. Projects that began intent on impacting the teacher's classroom management with respect to learning rate, learning content, learning style, and so on, ended by settling for the adoption of virtually any improved behavior. Projects which had hoped to individualize instruction were eventually willing to help any departure from the one-on-thirty norm. One project started out to get its teachers to eschew subordination, stop being authority freaks, seize control of their own professional circumstances, take responsibility for their own actions, suspend their hostility and suspicions, increase their time and emotional investment in their jobs (without additional remuneration), and otherwise dramatically depart from the teacher/administrator norm. The project ended up by abandoning its hopes of organizational democracy and measured its final success by the number of student-initiated verbal interchanges in the classroom.

Projects also consistently reduced their expectations about the proportion of people in any given site that they would be able to reach. The proposal version always had high hopes of

widespread impact but the later project experience was considerably more modest. The diminution demonstrates the gap between the trainers' intentions and the classroom teacher's prerogative and responsibility to implement only as much of the project's methods as seemed warranted to that teacher.

Most of these changes can be accounted for by the same sort of forces discussed above. Early successes exhausted the easy possibilities of congenial change and project techniques are often not adequate to more difficult problems. The early enthusiasm waned, critics mobilized the opposition, and reality kept battering away at grand expectations.

VI. NEAR TERM BEHAVIORAL CHANGE

Overall, the Rand project was an attempt to establish a number of things about how Federally-sponsored change agent projects were experienced in the field. Although success and/or failure was of course one of those experiences, the project was never an attempt to evaluate Federal policy and it was certainly never an attempt to evaluate discrete local projects.

While our disavowal of evaluation was an honest one, it could not be totally realized. Our primary purpose was to document the field reality of change agent projects but documentation implies some scheme for the selection of variables and how better to justify that selection than by reference to those things which, if changed, may improve practice? Second, once the documentation had been completed, the results had to be analyzed. To the maximum possible extent, we tried to let the data suggest explanations, we attempted to let patterns and hypotheses emerge naturally, and we tried to avoid prematurely categorizing projects by a dependent variable of success. Still, for applied social scientists it is very difficult to ignore a continuum or taxonomic principle which is always straining for recognition and which runs from "most-to-least successful." Finally, it should be remembered that we wished eventually to inform policy makers with respect to questions of educational change. Such a practical intent necessarily involves questions of the goodness of the programs. There is no way to assess the utility of Federal practices without having first assessed the utility of the various local experiences.

Therefore, we had to make very general estimates about the degrees of success of these projects. That judgment was based on the sorts of data which supported other parts of the study: the results from the extensive survey phase, any internal or external evaluations or audits available for each project, extensive interviewing in each site, and the evidence from our own observations of relevant outcomes while on site. For the staff development projects, we assigned the cases to only two categories -- most and least successful -- and put a remaining case into a mixed category because of its special characteristics. (A summary of the descriptive characteristics for each case by category is appended to the end of this section.) This section discusses the evidence of near-term behavioral change which could be attributed to the projects. The following two sections discuss the longer term outcomes which these projects may have, i.e., continuation and dissemination.

The most arresting finding from the cases was how little had been changed about any feature of the site (its teachers, social

context, student performance) which could be related to the project's intervention. There were changes but they seemed more episodic, faint, and dispersed than expected.

The only places where support for schooling, professional engagement, or morale changed were in the elementary and intermediate schools. The high schools were never affected. Three of the sites did succeed in improving teacher attitudes toward their work. The most dramatic case was the one in which the project was located in and confined to a single intermediate school. That school was a social-emotional wreck at the project's inception and by the end of the second year, the project efforts had demonstrably increased the staff's commitment, sense of responsibility, and personal investment. But the project had not yet succeeded in doing anything much about instructional styles.

On the other hand, a project which set out to work directly on teacher attitudes about and participation in school management failed to affect those things but did (somehow) manage to affect teaching styles. Apparently, the teachers learned about all the things that were supposed to be impediments to their communication with the school's management and then decided that the same phenomena were blocking their own communication with their students. For the other three projects, the attitudes of defensiveness, limited investment, and so on which characterize teaching as a quasi-profession and which contribute so heavily to determining teacher attitudes were simply too powerful to overcome with techniques applied.

If only three projects changed teacher attitudes toward their work and place of work, all the projects could claim some changes in instructional techniques among some of the staff. Those changes were all in the direction of better, i.e., more behaviorally indicated instruction, but the amount of people so affected varied widely. At the successful end of the range perhaps as many as a third of staff in as many as half of the project schools had changed as much as half of their instructional practice. The next most successful project could only claim changes of a similar magnitude in not more than 10 percent of its schools.

One of the keys to impact is the social and peer climate of the school. For change to be visible to the project leaders, or to most evaluations, it has to have a fairly dramatic and widespread impact on the school. But it seems certain that these projects had other impacts which, although not as visible, may in the aggregate be as important. First, there is the phenomenon of the isolated teacher who, alone among that school's staff, was affected, did change, and will persist in that change. In almost every school we visited there was at least one teacher who significantly departed from that school's norms and enacted a large portion of the project's techniques. Such "loners" have a difficult role to sustain but they were an important and often overlooked part of the project's accomplishment.

The second phenomenon probably accounts for even more of these projects' actual outcomes. That phenomenon deals with the tiny changes made at the margins of the instructional behavior of a great many teachers. Although the bulk of their practice might still appall the project staff, it remains a significant achievement if, after the project, "trained" teachers hit fewer students, allowed a slightly more interaction, coordinated one lesson plan a year with a neighbor, praised slightly more often, and so on. Not only are such changes barely visible and usually barely conscious, many teachers strain to deny them or at least deny that the project introduced them. Teacher defensiveness is such that many teachers with whom we talked deprecated project techniques and praised traditional instruction. But their classrooms frequently featured wall charts of student behavior, centers, and the paraphenalia of differentiated instruction. When asked to explain those features, they would usually claim to have been doing those things all along or to have invented them themselves although in fact that was not the case. In assessing the total impact of these projects, the contribution of these two groups --- the isolated "loners" and the "denying doers" -- needs to be added to the more dramatic and rare instances of school-wide transformation.

Given the faintness of these projects' impacts on the smaller population with which they were in more direct contact (the teachers), what can be said about the project's mediated impact on kids? Most projects claimed pupil changes of various magnitudes. But the project-generated achievement data seemed prey to the same problems which make all achievement data so notorious. Where projects set out to provide services directly to students, or to incorporate kids in the training group, that never happened. Still the children were undoubtedly the beneficiaries of some amount of the instructional changes stimulated by the projects.

In only one instance was the fate of the project of extreme interest to the district's superordinates. In that case, the project constituted 90 percent of their attempts at reforming the district, and thus they regarded it very highly. In another case, the project's resources were the only leverage available to a superordinate although he simply could not get a handle on them fast enough to turn a floundering activity to his own advantage. In most cases, superordinates were mildly pleased to have the projects as symbols of their modernity but indifferent to the outcomes.

The two least successful projects were presided over by classroom teachers who regarded their project roles as a temporary duty assignment. Especially in the concluding project years, when they were anticipating re-entry into the classroom, they studiously avoided making waves -- and thus nothing happened. The other three projects were all much more central to the career prospects of their administrators. For this group, the project

represented their first exposure to systematic, conscious, and concerted attempts to reform large parts of an educational organization. They enjoyed the experience and they would all do it again although all three expected to be forced out of their districts as a direct result of their project roles. In only one case was the departure anticipated as a violent event. But the other two came to understand that their critical attitudes toward their colleagues' work, their necessary advocacy of a "superior" position, and the removal of the protective project cocoon all made it prudent for them to seek employment elsewhere. Still, that other employment which they seek will most likely be in a role similar to their current one.

Figure One: Summarized Project Characteristics Related to Amount of Success

A. The Least Successful Cases

Case #4	Case #5
°Interrupted leadership. Some commitment but also uncertainty about content of techniques.	°Changing leadership. No confidence in techniques. Status quo orientation.
°No real goals. Search for problems which might be helped.	°Goals of organizational maintenance.
°Change from bottom up.	°No change intended.
°Simple project treatment.	°Laissez-faire, situationally determined project treatments.
°Consultant provision of materials with little on-site development. No trainee progress evaluation. Relevance only to one part of of the teacher's role (participation in management).	°No materials. High role relevance.
°Strong theoretical base but among consulting group, not project staff.	°No theoretical base.
°Limited availability of staff to project treatment.	°High availability of staff to project treatment.
°No rewards, only risks.	°No rewards.
°Low felt need among a knowledgeable but complacent and suspicious population.	°No felt need among a veteran and extremely resistant population.
°Superordinate opposition; opposition from principals.	°Superordinate support; subversion by principals.
°No peer group support. No critical mass.	°Same

B. The Two Most Successful Cases

Case #1	Case #2
°An integral, highly committed management group that stayed with the project from its initiation on. The group provided itself with social and material support against opposition.	°Same as #1 plus overtones of true-believer, messianic and revoluntionary spirit.
°A goal of substantial transformation in the most important areas of the district's teaching practices.	°A goal of revolutionary change in all parts of the system.
°Change initiated from the central office middle management level down.	°Change initiated from the higer reaches of the central office down.
°A relatively complicated project treatment with several components and sequences.	°An extremely complicated and comprehensive treatment.
°Strong emphasis on on-site development of materials and written curriculum. Material to allow multiple entry points, teacher pacing, and independent but non-invidious evaluation. Highly role-relevant training.	°Same as 1.
	°Strong theoretical base.
°Availability of some staff assistance on site.	°Limited on-site staff assistance. Some demonstration lessons.
°Some material rewards as reinforcement for continuation not as incentive to begin.	°Same as 1.
°Very high felt need among an innocent and trusting training population.	°High felt need among an innocent but xenophobic training population. Some teacher motion in a direction of the project could reinforce.
°No opposition; some principal support.	°Opposition and very little limited support from principals.
°Peer group support in the schools and several critical masses.	°More limited supported and fewer critical masses.

C. The Mixed Case

Case #3.

This case is different from the others in that the project leadership refused to force the pace of the training activities until they felt that the majority of the school's faculty wanted to change and had assimilated an OD truth/trust attitude. Thus, in the first two years of what was nominally a project to differentiate instruction, there had been no attempt to communicate the technology or content of staff development.

°A single leader through the project but a management group which was elected by the teachers and thus fluctuated. Some cohesion against opposition.

°A goal of substantial change in several areas but patience about the rate of progress.

°Top support and several superordinate moves that paralleled and reinforced the project's moves.

°A persistent stress on a single theme (truth-trust) to date.

°A fetish about bootstraps. Total on-site determination of project activities but few materials. Independent, non-invidious evaluation. Focus to date not perceived as being very role relevant.

°Material but not staff assistance to trainees. No demonstration lessons.

°High felt need among a frustrated and suspicious population.

°No opposition; support from principal.

°Very strong peer group support and critical mass, but at only one grade level.

VII. CONTINUATION

The key question here is, what characteristics of the project were likely to be continued after the end of Federal support. To iterate the point made in the methodology discussion, this judgment was in large part an informed guesstimate.

The continuation of project efforts in the most successful district appeared assured if only because the materials and procedures produced will remain intact and the training activities were never dependent on pacing or guidance by the teachers themselves. Thus the project's dissolution should still leave a stock of materials with which many of the district's teachers have already had a favorable experience. To add to that happy prospect, the project staff had lobbied hard and successfully to get completion of parts of the training materials accepted as qualification for a higher step on the district's pay scale. Then, when the SEA required all districts to come up with a new set of performance competencies for re-certification of their faculties, the project staff successfully inserted their project's own list of desired teacher outcomes. All teachers must now pay more careful attention to those standards. Since the project never had to face any significant opposition and since a high proportion of the district's teachers have had a favorable experience with the training, the prospects for the project's continuation seems good.

It needs to be noted, however, that as a discrete special-purpose staff, this project will not be continued. The headquarters specialists will return to the units from which they came, and they may continue to do some project-related activities, but beyond that and the provision of a small amount of money to cover materials, the "project" nature of these activities will disappear. The more important continuing participation in the training activities will not.

Similar points may be made with respect to the other of the clearly successful project sites. There, the staff anticipated from the beginning that the re-emergence of the conservative forces would sooner or later overwhelm the project. Part of the staff's drive to produce a great many materials, and to infiltrate all parts of their bureaucracy was in preparation for that contingency. The hope was that out of a "blanket" or "cascade" of services, some would survive. In addition, in order to guard against backsliding on the part of project personnel who were returning to their former (unreconstructed) environs all such personnel were required to undergo the complete training cycle a second time. The project's enemies have moved vigorously against it, but the project will have "gone underground" and thus the activities should survive to a certain extent.

In the mixed case school, where the project's development has so far been arrested at a stage substantially prior to the enactment of many of the project's goals and technology, it is very hard to predict continuation. The theoretical justification for emphasizing interpersonal communications is so that the ensuing changes will be more profound and more lasting. So one hopes.

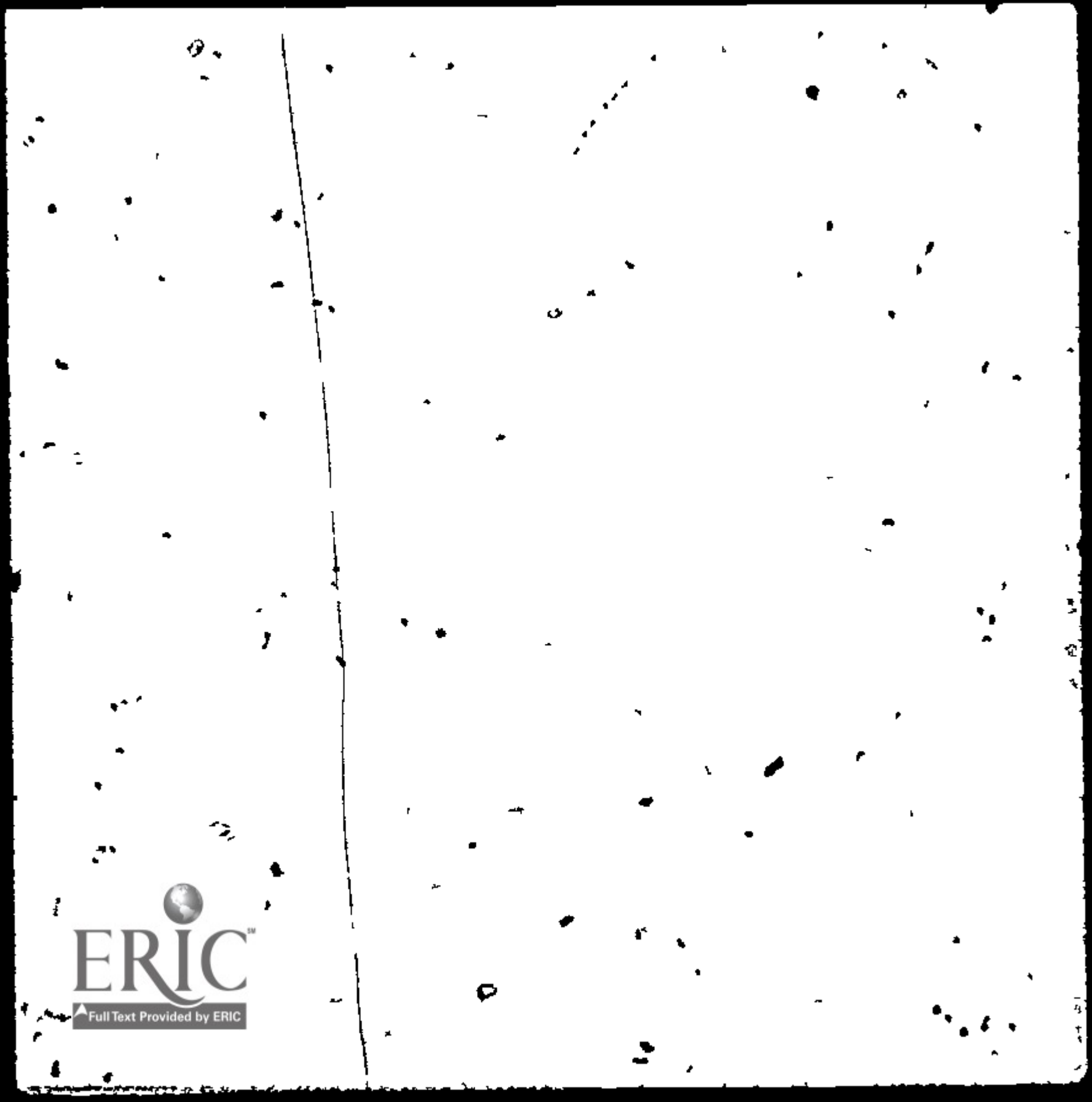
The most that can be hoped for the other schools is that those relatively fewer teachers whose behavior was affected will not return to their old patterns of behavior. There is a lot of evidence to support that expectation. Most of the teachers whose instructional practices were changed as a result of these projects were already somewhat dissatisfied with their performance or became persuaded of its inadequacy. There was a great deal of consensus about how impossible it would be to move back to large group, teacher-talk instruction and, to a person, our respondents denied that they ever would. Thus, at the atomistic but still important level of the individual, continuation seems to have a reasonable prospect.

VIII. DISSEMINATION DIFFUSION

The key question here was whether the project got disseminated to other schools or districts. There is not a great deal that can be said about what hasn't happened. Only two projects demonstrated any real impact on any schools other than the target schools. In both cases that effort was linked to the personal drives of the project's leadership. In one case, the leader was a former professor who had a habit of publication and a need for career-enchancing publicity. In the other case, the project director had set up a statewide organization of project directors as a defense against what he felt was SEA interference. He did a lot of speaking, inevitably about his own experiences, and therefore got a lot of publicity, visits, and requests for information from his colleagues.

All projects felt hampered by SEA and Federal regulations putting stringent conditions on their dissemination activities. In the absence of any broader audience, the only people to whom the project might be diffused were the other schools in each district. That did not happen either.

It was a unanimous experience of these projects that, regardless of their degrees of success, they were studiously ignored by their district colleagues. Although the school may have been a virtual Walden III, visitors were still more likely to come from 200 miles away than from 2 miles away. The educator's insecurity is probably the chief explanation for this. Someone working in the same environment with roughly the same resources who does a demonstrably better job is seen as a threat, a show-off, and probably a cheat. The same phenomenon applies among faculties. Teacher trainers are much more acceptable when they travel to neighboring schools than when they try to ply their trade in their own schools. The educator's response is to ignore the lighthouse school if it is close to home and instead go far enough away so that (a) asking for help can be a more anonymous and "safer" experience; (b) it won't be necessary to acknowledge the superiority of someone with whom you are in competition; and (c) the ideas can be changed with impunity and then (d) credited to one's self.



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ABSTRACT

The theme of the 1970 Congress of the International Council on Health, Physical Education, and Recreation (ICHPER), where the papers in this collection originated, was "New Endeavors in Health, Physical Education and Recreation." After the opening and the presidential address, there are three papers listed under the heading "General:" "How Standard is your Deviation;" "The Need to Popularize Physical Activities;" and "Physical Education--Tool or Toy?" Under the heading "Facilities" is the paper "The Development of Sports Facilities and their Equipment." The next section, "Research," includes papers on kinesiology, personality and perceptual factors in motor performance, gross motor skills to predict and avert reading failure, physical education for women, and the application of physical education research results to practice. The next section is devoted to papers from the "Eighth Conference of the Australian Physical Education Association." The remaining headings for groups of papers are as follows: "Recreation and Outdoor Education;" "Innovative Experiences;" "Health Education Seminar;" "Australian Sports Medicine Federation Abstracts;" and "Looking Ahead." The collection concludes with the closing address of the Congress and 1970 ICHPER Resolutions. (JA)

The Thirteenth International Congress of the International Council on Health, Physical Education, and Recreation

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CONTENTS

OPENING ADDRESS

SAMUEL W. COHEN

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If we leave to the biologists and the anthropologists the question where we come from, and if we leave to the theologians the question where we go from here, we have at our own disposal the question of the present—what Carlyle called "this poor, miserable, hampered, despicable Actual, wherein thou even now standest". It is out of this poor miserable Actual that one has to make the good life.

In this business of helping people to live the good life, right here and now, what does your learning have to offer? In what ways are your concerns the concerns of a liberal education, because that is the only kind of education worth thinking about. By a liberal education I mean that education which liberates and frees a man's mind—which renders him a free, conscious, responsible person—an independently operating intelligence—this is the liberating effect of a liberal education. Does your learning deal in these things? Let me recount an experience and then venture a comment.

Many years ago—I am now old enough for the phrase "many years ago" to have real meaning—I was one of a group taking part in a study tour through Denmark. We spent most of our time visiting and observing the famous—deservedly famous—Danish folk high schools. Among those we visited and lived in for a short time was the famous physical education folk high school at Ollerup under the charge of Niels Bukh. The place was magnificent—the buildings both beautiful and functional, the setting glorious. One evening during our stay, Niels Bukh arranged for the whole school to stage a demonstration for us in the enormous auditorium. The whole school, with breathtaking precision went through Bukh's table of exercises—we saw the glorious flowing movements under the personal direction of the great man.

Now for my comments. I may be wrong—perhaps at the time my immaturity led me to a wrong interpretation—perhaps my background understanding was too imperfect. Impressive as the performance was, it seemed to me that there was in it nothing of individual humanity. What I saw seemed to be not the sum total of many individual humanities at work, but the subordinating of individual humanities for the sake of a mass effect.

Another thing that has frequently given me concern is summed up in Brian Coghlan's intriguing phrase—the problem of reconciling the needs of the sporting virtuosi with those of the short-winded rank and file. In my young days, if you were not one of the sporting virtuosi, then as far as physical education was concerned you just didn't rate. I am satisfied that much more needs to be done for the short-winded rank and file. Whether instinctive blind faith was at work, or whether there lurked in

my unconscious some of the ideas implanted there years ago by my physical education colleagues, I do not know; but for whatever reason, I have insisted that, in my own still new university, while providing the sporting virtuosi with first-rate sports fields and equipment, the short-winded rank and file are to be provided for, in modest facilities built close to the academic centre where they can play their squash or work on equipment of various kinds, without having to win a place in one of the representative teams. I am delighted that already we have to build more squash courts and add some more bays to the first stage of our gymnasium.

Some of us plain men are sceptical about organized exercise. Perhaps my own scepticism reflects the attitude of a senior colleague of mine who died recently at a very ripe old age—right up to the end he was healthy and active and alert. When I was a young academic very much in awe of the great scholar, he used to warn me against the dangers of exercise—but when I asked him how he came to be so obviously fit, he would tell me that it was because of the exercise he got acting as pallbearer at the funerals of his athletic friends.

For many of my generation life has lost its serenity. We are doing jobs that are complex and demanding, and are becoming more so every day. Can you give us back the clear-eyed, wholesome view of the world that we had when we were young? Can you help us to the inner calm and feeling of physical ease and well-being so that we can cope with the unremitting demands made on us and store up the inner resources to enjoy the last part of our lives? As usual, the poets say things more clearly than anybody else—and that is the main reason why everybody should study poetry—you recall Robert Browning's Rabbi Ben Ezra—

> "Grow old along with me!
> The best is yet to be
> The last of life, for which the first was made."

When one is young, the inner calm and the feeling of well being are there almost as a divine gift—we revel in physical activity and movement which come as easily and naturally to us as breathing. But then we get caught up in the rat race. When it is too late, we stop and take a sober look at the way we live—and what we see is not pleasant to contemplate. In this country of great open spaces, we live huddled together in congested cities—we pollute our atmosphere, we are slowly choking our environment and ourselves.

You know all this better than I do. You know the statistics on the increase in the incidence of heart disease. You have all the evidence on the desperate plight of those who do not know how to use the greatly increased amount of leisure time modern technology is now making available. You know all about the effects of urbanization and of overcrowded living conditions. You know how extensive is the scope of physical education and of recreation. You know that there are no age limits to those who can benefit from your knowledge and skills. Get all that knowledge to work.

You professionals know how to make physical well being a lifelong thing. You are yourselves doing this. You are all examples of your own

teaching. But how do you get others to make it a lifelong thing? Do you do it by inculcating good habits and attitudes into young people so effectively that the habits and attitudes will stay with them all their lives? Ideally, of course, that should happen. But I am sceptical enough to think that it doesn't happen that way very often in any area of education. How many people carry through the whole of their lives the habit of reading good literature which they were introduced to at school? For most people, every kind of learning needs reinforcing regularly. It is too easy to let things slip. Perhaps those business organizations that require their senior executives to have physical checks from time to time are right. Perhaps we need to be required to keep ourselves fit physically just as we ought to be required to keep ourselves fit mentally and professionally. Too many professional qualifications are lifelong licences to practice which hold good no matter how a man's capacity deteriorates while his knowledge falls farther and farther behind. I shall come back to this in a moment.

You people have expert knowledge of some of the requirements of the good life. The research and scholarship represented in this gathering, if put into action on a wide enough scale, could transform and enrich the lives of many people. Unfortunately, our education is still too much dominated by the medieval notion of book learning. Many of us who wouldn't dream of driving a car five years old will cheerfully allow our children to suffer an education that is fifty years old. Many of us who wouldn't wear last year's fashions will not question last century's education for our children.

If only the energies of young people which now go into demonstrating and protesting about Vietnam and such issues could be channelled into vigorous protests about many of our tragically unchallenged ideas and practices in education—if only they could be persuaded to hold protest marches to demand the right to an education that will help them live the good life. If only they would bring their pressure to bear on those who defile our environment and make it unfit for human life.

I hope that out of this congress will come vigorous and effective action. Carlyle told us that "conviction is worthless till it convert itself into conduct. . . . Doubt of any kind cannot be removed except by Action". In this country there is already plenty of action; we are doing much in physical and health education and recreation.

I see here today people to whom I want to pay the highest possible tributes for what they have achieved. I see here, for instance, Gordon Young—a man of such clear vision, driving energy and enthusiasm that he drives everybody nuts who works with him—but he knows what he's after. Perhaps I embarrass you, Gordon—but it's a duty to embarrass him. I remember how, thirty years ago, Gordon stumped the country burning with energy and enthusiasm, stirring in teachers and the public a realization of a new world—a new range of concepts in physical and health education. Today the results of his work are there for all to see. There are here today physical educationists who were once my colleagues and, I hope, are still my friends; when I worked with them I learned that it was sometimes wise for an administrator not to enquire too closely

into how they got things done. Physical educationists tend to work in their own somewhat dashing ways, and I learnt to let them have their heads and stand back. They have accomplished much — just as their counterparts in other parts of Australia and in other countries gathered here today have accomplished much. In this country we have nothing to apologize for in what has been achieved in physical and health education and in recreation. We need not be modest or ashamed at what we have done. Perhaps we should be ashamed at what we have *not* done—but that is not the fault of the physical educationists. They have achieved all that could have been achieved, and if they have not succeeded in persuading others to stake them to more, that is not for want of trying.

We are not doing enough, and we are not following through with the older groups the excellent work we are doing with young people. I hope that you will discuss the strategies of educational decision making. You have an excellent product to sell. I hope you will not spend all this Congress discussing the product; I hope you will spend a lot of time deciding how to go out and sell it and, if necessary, it will have to be a hard sell—an aggressive sell. If necessary, you will have to frighten people, to blackmail them, into buying your product. I am afraid that in these days many important decisions are made only in response to pressure and, sometimes, as a reaction to fear. You must exploit what the psychologists have to teach about how to influence people. You will have to campaign—vigorously, and even unscrupulously—to get adequate provision for what you have to contribute to helping people live the good life. The end will justify the means. Remember that it is the squeaky wheel that gets the oil—don't just squeak, shout!

You must study the psychology and the politics of decision making. The Minister could tell you that not all decisions that come out of a Cabinet Room are the result of the application of pure theory and dispassionate calm analysis of carefully collected data. Many decisions are the result of pressures—and often that is right. That is the way of democracy. Policy decisions must reflect what most people consider to be right and beneficial. In that sense, honest pressure groups are the essence of the democratic process. Properly and intelligently organized, they can be the means of focussing attention on important public needs and of clarifying political thinking and decision making. The trouble with so much of the public demonstrating and protesting we have witnessed lately in all parts of the world is that it has rarely reflected what most people want, nor is it usually constructive.

So then, in conclusion, let me try to repeat the central thought of a puzzled man on matters which are doubtless crystal clear to all the experts here. My central puzzlement concerns how to prevent any form of education—and physical education can be no exception—how to prevent education degenerating into technique, because, as Sir Richard Livingstone said a long time ago, "the life tends to go out of all subjects when they become technical . . . so easily can education decline into routine and mechanism". The central issue seems to me to be this: how to make your area of education a warmly humanizing, liberating experience which will stay with people for the whole of their lives.

PRESIDENTIAL ADDRESS

KLAAS RYSDORP

President, ICHPER

The Congress Theme

OUR Congress theme is "New Endeavours in health, physical education and recreation".

It makes sense to ask at the beginning of the Congress: Is it necessary to speak about *new* endeavours? We, professionals in physical education, have we not known for a long time what we want in physical education, what we need, and what we have to do? Is it our real intention to come to *new* endeavours? Are our old ones not good enough? Do we always have to change? Do we not make opportunities for superficiality if we have the attitude of steadily renewing our work? Is that not only an attempt to remain fashionable?

This objection leads to the next question: *What* do we want, or *what* do we have to change? And why?

Physical education is the educator's encounter with the pupil in the field of movement and body-experience. Exercises, games and dances have a certain value in themselves, but essentially they are only the constituting factors in the field of intercourse in physical education. The essence of physical education asks for the extent to which the educator within this field of activities is able to transfer his educational intentions to the pupil. The essence of physical education asks also for the extent to which the pupil works up the action of this intercourse in himself so he might approach *his* state of adulthood.

In an earlier ICHPER-Congress I characterized the state of an adult as creative and regulating independence.

In English you generally speak of an educator and a pupil. But since it is generally agreed that "educator" is a wider term than "teacher", there is a need for a term wider than "pupil". The English educationist Adams has suggested the word "educand" to fill the blank, meaning "the person to be educated". And James S. Ross says: "It might be well in the interests of clear thinking to follow his lead."

I do not make this problem of English terminology a serious question. It is not up to me, I am hardly able to speak any understandable English. I only mention the question to show that physical education is more than instruction. It *has* to do with teaching, of course; but in a deeper sense, physical education is searching chances in the intercourse, to help the educand on his way to creative and regulating independence.

Well, here we get the answer to our question: Why should we change our work?

The educational encounter concerns two persons: An independent, experienced and mature man and a youngster who has to develop himself to a state of independence, experience and maturity. These two persons, educator and educand, are not closed entities in the world, but they exist as entities as parts of the world. Each of them has his own world of experience. This world is always changing. The world of 1970 is different from the world of 1930; and people of 1970 (youngsters and older ones) are different from the people of 1930. Therefore the situation of encounter in physical education has changed. The world and people change, constantly renewing themselves. So education has to change too. It is impossible *not* to change. And so it is with physical education.

Now the question: What changes?

An opening address has to be brief, therefore my answer must be concise:

1. The body-image changes.
2. The motor-experience changes.
3. The style of moving and the attitude change.
4. The supply of subject-matter (exercises, games, dances) changes, as well as the motivation to find something attractive or not.
5. Also the aims and objectives are not the same through the years.
6. And our knowledge about effects of exercises, didactical and technical methods expands.

If we want to keep pace with the course of events, we constantly have to focus on new endeavours in physical education, and also in health and recreation.

It is not the time now to say much about it. What I have said about physical education, however, applies also for health and recreation. I only give one single example of each, to show you what I mean.

In the industrial parts of the world a whole new chapter in health education is to be written: the air-pollution. A new endeavour in health education for the whole world is the hygiene of the environment. Is the world still worth living in, is it even possible to live in a world where all oceans are dead?

Concerning recreation, not only the automation of the society asks attention, owing to the changing labour-pattern and the leisure-expansion. The urbanization also asks attention: our alienation from our primary circumstances of life, from nature, climate, day-and-night-rhythm.

There are people who try to avoid our stone-steel-and-glass-culture through conscious-widening by means of drugs; but a healthier and more adult way (in the sense of creative and regulating independence) is outdoor-education, which here and there starts to be a new attitude in the education-system.

Health, physical education and recreation are corresponding factors in education, and new endeavours are constantly necessary.

Worldwide Work

ICHPER is glad that we have our Congress in Australia, a country that in the same time is a continent, as Europe for example, the part of the world where I come from.

Australia is very far away: not for the Australians, but for the Europeans.

Ancient people always had the idea that they lived in the centre of the world. The classic Greeks had the idea that Delphi was the centre of the world; for the Jewish people it has been Jerusalem; the Chinese have found it in Peking; the Indians planted their totems in the middle of their settlements, and they estimated that to be the centre of the world—of *their* world.

Europeans speak of the Near East, the Far East and the Far West. But it is only near or far, east or west from Europe. So in the time that these terms arose, Europe was thought to be the centre of the world, the centre of the structuring lines of the world.

All men are inclined towards the attitude of taking their own positions for the centre of the world. All people plant their totems, and structure the world from there.

But ICHPER is world-wide. It plants no totem, but finds its way and home all over the world. ICHPER is a platform where everybody in the world who loves health, physical education and recreation, has the opportunity to announce his new endeavours.

This platform is transportable. It is now here, in Sydney; and on this platform will our Australian colleagues meet, to have their 8th National Conference. ICHPER is happy to deal with Australian colleagues.

There is a condition, however, to make world-wide work fruitful. ICHPER must not be an announcements- and statements-platform only. We must learn more and more to *listen to each other*.

It happens too often that somebody hears a person speaking, and says: "Most interesting", without real listening. Afterwards he goes his own way and works in his own manner, having heard nothing. We must learn to open our minds for each other. *Real* listening is difficult. Perhaps we have to learn more listening than speaking, also, in this Congress.

We must also learn to answer. Our answer must be related to what has been said. Discussion is not only a skill, it is an attitude. The informal discussions between the Congress participants provide many opportunities to learn this art.

Consequences

What are the consequences of the fact, that ICHPER is world-wide?

The ICHPER position has a clear disadvantage. Its work is less visible and less surveyable than, for example, the work of a national or regional organization. This is the reason why outsiders, also outsiders within the professional area, easily forget or do not observe the ICHPER-

contributions in our field, but the world-wide position has also enormous advantages. I mention:

1. ICHPER has a survey about the status of our profession and the developments in the world, and through this ICHPER is able to promote a broader vision and a vision on the future in health, physical education and recreation.
2. Strong countries can support weak ones, and the so-called strong countries may learn that the so-called weak ones sometimes have a freshness that the strong countries have lost.
3. The participants in the ICHPER-activities learn the relativity of their own opinions. There are so many opinions, so many solutions, circumstances, methods in the world which you do not know at home. This may teach us that people can be happy in a way which we did not learn at home, and that our profession can be served through methods, techniques and organization schedules which are not quite the same as in our countries.
4. In this way we learn mondial thinking, and we better prepare ourselves for the future development of the world. For the world becomes smaller and smaller in our experience, because the area in which we live and move becomes larger and larger.

Activities

ICHPER is an independent international member of WCOTP. Through this it has a direct contact with all teaching professions.

But ICHPER has also more international relations. In a tripartite committee we work together with ICSPE and FIMS. During the Olympic Games in Munich both the UNESCO-related organizations ICHPER and ICSPE will work together to organize the UNESCO-day in the scientific Congress.

IAPESGW and AIESEP are independent international ICHPER-members. There is a new contact with IAKS. And there is a good hope that in the future the contacts between ICHPER and FIEP will improve.

Further, we have good contacts with regional organizations in Asia, Africa and America. In addition, we have sponsored different international meetings.

ICHPER has conducted international research about the school curriculum, teacher training and the status of teachers of physical education. This has been done in cooperation with UNESCO, and is a real contribution to international knowledge of these items.

Everywhere ICHPER has its Congress we dedicate a whole day to health education. Now ICHPER prepares practical guides on swimming, soccer and volleyball-teaching, with many designs and a very brief text, intended for countries where only few materials are available for teacher training.

This year we published the report about the ICHPER-case study on physical education in Chile, and lastly a working paper about facilities

and equipment in schools, the ICHPER-contribution to the UNESCO-expert meeting in Gothenburg, Sweden. Our best-seller is still always the ICHPER-Worldwide Book of Games and Dances.

ICHPER has four periodical publications: the ICHPER magazine *Gymnasion*, the ICHPER Bulletin, the ICHPER *Asian Journal* and the Congress proceedings.

These are some of the highlights of what we are doing.

Epilogue

We shall be together here in Sydney for five days. We shall speak, listen, discuss. We shall enjoy the good organization of our Australian colleagues. We shall enjoy the Australian hospitality and the magnificent city of Sydney.

Through all these we shall strengthen:

- our love of health, physical education and recreation for the youth in our countries and in the world;
- our dedication to, and our knowledge of, our profession;
- our dedication to our world-wide platform ICHPER.

I finish with a word from our Honorary President, Dorothy Ainsworth, for it expresses by own belief: "It is my belief that ICHPER has the opportunity and the ability to move always forward toward our goals, even as they change and grow over the years, and to do this through the international fields of health, physical education and recreation."

With these words I open the Congress, and I wish you good, new endeavours.

GENERAL

"How Standard is your Deviation?"

ALBERT W. WILLEE

Director of Physical Education, University of Melbourne, Australia

The Congress Theme

THE word "New" suggests that in the immediate future there may well be a revolution, but experience and history show that educational changes evolve through gradual processes and not by sudden revolution. "New" might suggest that we need to ignore old boundaries, or to seek and set new ones which may lie either within or beyond the old. Both are necessary. There are many unsolved problems of long standing to some of which no solution has been found, and others for which no solution has, in fact, been sought. In some cases, solutions and attempts to provide solutions vary from country to country. It is essential that solutions be sought which will be in accord with local conditions.

Unsolved problems include pathological outcomes arising from improperly applied activities, sometimes conducted by enthusiastic, unpaid amateurs, by teacher-appointed schoolboy "leaders", but all too often by highly paid, untrained, unskilled "experts" in commercial health studios. The relationships between competitive sports and physical education, betwixt games playing and citizenship, international co-operation, appointment of specialist teachers at primary level, a common terminology, play-dance games type [illegible] programmes, as opposed to systematic education, these are some of the problems and confusing concepts which have been with us for years.

The most recent and most pressing problem—hypokinetic disease—is, of course, not merely a matter of technology taking the muscle out of work and play, not only a question of modern man forced into the role of inactive machine watcher and manipulator, the tense, strained knob twiddler and dial observer; the problem is compounded by the parallel advances in pharmaceutical phenomena. Now there is readily available a variety of pills and potions to accelerate, decelerate, reverse or negate every human biological function. The advancement of knowledge is leading to the retardation and ruination of health and fitness.

The use of "New Endeavours" in the theme strengthens my conviction that we should here be concerned with re-directing our attention to perennial problems. In looking to the future we can ignore neither the past nor yet the present.

It is in order, perhaps, to say a few words too about the title of my talk. At the present time we live in a changing scene. This is erroneously called a permissive age. It is more likely that future historians and historiographers will label this the age of selfishness, characterized by lack of self-discipline, self-gratification, self-indulgence and the adoption of anarchical democratic procedures wherein youth confers on itself instant experience and the wisdom denied their elders. We live, indeed, in an age where knowledge is mistaken for wisdom and authority capitulates to youthful arrogance.

The image of the human being and of the physical educator is changing, and it is not without significance that we may feel the need to take stock and consider what deviation may be thought of as standard.

Aristophanes, for example, in his description of the young men of his day, included the statement that "if your mode of life is up to date, you will have a weak body, a colour sickly pale, narrow shoulders, an immense tongue"; but he made no mention of sideburns, of long, limp, lank male hair, of tatty jeans or of the unwashed body. What is a deviate? How much deviation can be considered as standard? These are matters of some importance. It may be that at this time the clean-cut, upright, clean-looking physical educator may be changing.

Our first duty is to recognize that there are problems associated with physical education. With full recognition, solutions may be sought.

Physical Education — The Process

The concept of physical education as a process is imperfectly understood by non-specialists, and its wares are too often decried by misguided physical educators themselves, who conclude that the denigration of their working tools and wares automatically bestows academic respectability upon the discipline and upon themselves. Some physical educators, as they grow older, come to regard the teaching of skills—that which attracted them to the profession—as being less dignified than talking about skills.

For donor or recipient, for master or pupil, the physical education process must be understood as education of the whole man by means of physical procedures and experiences. An education through the physical means subjecting someone or being subjected to a varied host of experiences centred around human movement.

Man is a biologically integrated being, totally involved in whatever he may be doing. Activities differ, not in kind, but only in emphasis upon the intellectual or the physical. When you are involved in a game, whilst running at top speed, with brain working like a computer to initiate changes in direction and speed in relation to other team-mates, to the ball, to opponents, constantly receiving, interpreting visual, auditory and tactile stimuli, it might be very difficult to decide where, in fact, the emphasis,

intellectual or physical, was at that particular time. For the individual, such a situation is further complicated by emotions such as excitement, fear, anger and distractions like the roar of the crowd. On the other hand, in an activity such as "push-ups", the intellectual involvement is limited and becomes, perhaps, important only when endeavouring to do one more push-up than one feels, or thought, to be possible.

The process of physical education consists of more than teaching or acquiring skills. Whilst it is true that a child may need to be taught to kick effectively, to strike, to climb, twist and turn under a variety of conditions, push and pull; that child must also learn that such skills are appropriate for employment only under certain conditions, at appropriate times and for good reasons.

Physical Activity and Healthy Living

Our first endeavour in this domain, the first problem, is to convince the members of our own profession that it is in fact *our responsibility* to lay the foundation for an appreciation of the need for physical activity as an essential part of healthy living. In this connection it is important to welcome the assistance of the medical profession, the National Heart Foundation, and any other allied body interested in the solution of this particular problem, without, of course, allowing our responsibility to be usurped, especially by late-comers to the field.

It is our responsibility to educate the general public, professorial boards, industrial leaders, trade union executives and their members, to appreciate the fact that physical activity is an essential part of healthy living. Our leaders must be convinced that one of the finest investments that industry and commerce can make is an investment in the health and fitness of their workers.

At the same time we have to ensure that there is an understanding amongst all these publics and all these peoples that whilst the means in our profession are physical, the outcomes, properly sought and planned for, are indeed educational, involving and affecting the "whole man". It must be emphasized that mere participation is not enough to ensure desirable outcomes. These must, in fact, be planned for; programmes and activities must be conducted on the right lines if the most is to be made of the facilities and the money that is made available for their conduct. This, in turn, implies trained leadership. It would indeed be wonderful if, when we had convinced all these people, they would, in fact, then take action. But it is a truism that knowledge and understanding do not, of themselves, necessarily mean a modification in behaviour.

Public Involvement

Thus, the second endeavour which ought to be tackled, and tackled as a separate problem, is that of achieving wide-spread community involvement.

If children leave school without a well-liked, healthy, recreational activity, without an appreciation of the importance of regular, vigorous, physical activity, and an understanding of such activity in relation to the

other essentials for healthy living, then indeed this is a reflection on our programmes. We may cry, and we should continue to cry out, that this is due to lack of qualified staff, inadequate facilities and ungenerous time-table allocation. We do, however, need to examine the proposition that perhaps the best possible use is not being made of the limited staff and facilities at our disposal. It is in this area that school and community needs may perhaps be best served in the short and long term by closer liaison and common usage of personnel and resources.

It is pertinent, too, at this juncture to ponder the possible hazards of "life-time" and "life-long" sports movements. To stress inactive activities at a developmental stage when vigorous activity is a biological necessity, is unnatural and likely to be unprofitable, except for the manufacturers and vendors of the paraphernalia of inactive recreational pursuits. By all means let us have broad-based programmes and, if it so happens that the child becomes adept in a comparatively inactive recreation, efforts must be made to find something of an active nature which will also interest that individual. Such a child may be encouraged, perhaps, to understand that his performance, even in an inactive pastime, may well be enhanced if he is more efficient *in toto*; the whole is more than the sum of the parts; but the parts need to be in good working order.

At school, habits may well be established before full understanding is either possible or desirable. At a later stage, reasons may be given and values established. Sheer enjoyment may well be the initial motivation. Coupled with feelings of enjoyment and satisfaction, the developing youngster may be led to appreciate that the acute and chronic beneficial effects of activity are measurable. He can be made aware, through personal experience and directed study, that mental alertness and fitness go hand in hand.

The third endeavour needs to be directed towards the introduction and the development of what is variously known as "ausgleichsgymnastik", "gymnastique de pause", and "production gymnastics". At the first international conference on the subject, in Belgium in 1967, it was shown that many thousands of people were regular participants. Research has shown that the introduction of the active break leads to reduction in absenteeism and unpunctuality and an increase in production, with more contented workers. In "China News" (No. 4, 1966) it was reported by a party official at a Peking automobile factory that: "It is not a question of whether one finds it interesting or not, when one understands the need to keep fit for the revolution then one should consciously go in for physical training". The trend towards shorter working hours, a shorter working week, longer holidays and longer, more frequent "smokos" may reduce the incidence of industrial accidents which are due to fatigue, but will certainly not increase production or in the long run make for happier, healthier workers. The introduction of active smokos might well do just those things.

It now appears that Canada and America, unable or unwilling to profit from the experience of the United Kingdom, must repeat the sorry story of yester-year. Some of those present will recall how teaching gave way to leading children into fresh fields of experience. One did not

counsel or guide, but washed the windows of the child's mind. A recent Canadian publication[1] suggests that "stop" is no longer a command, free spacing is not a formation, that demonstration is the sole reason for appropriate physical education teaching uniform, that there is no front or back to a class, that it is immaterial whether children look or listen. The problem-solving approach, it is claimed, makes all children successful. It appears that the children we teach are so stupid that whilst the problem of getting from one side of a box horse to the other can indeed by solved by the use of a ladder or by performance of a front somersault with full twist, the two pupils will judge both performances to be of equal degree of difficulty. We are to believe that no child should know the truth about himself. There is, seemingly, as much gullibility in the teaching profession as there is amongst the general public.

Material does not, of course, dictate method; teacher domination need not express itself solely in drill movements, nor does it necessarily neglect free practice, or prevent spontaneous group formation. A games atmosphere can indeed be destroyed by a wrong approach. Tunnelball "by numbers" or successive blasts on a whistle is a splendid way to kill enjoyment. Equally, lack of a good formalized caution, pause, executive-type command to start a race makes a mockery of a fair start. The scene is further complicated—as in England and Australia—by the attachment of different interpretations to the term "Movement Education".

Physical Activity

There is ample evidence to suggest that too few people regularly take adequate vigorous physical activity. A recent survey of Australian university undergraduates[2] indicated that no more than 5% of students have a reasonable—about five hours per week—amount of activity. The Commonwealth Year Book reveals that deaths from coronary heart disease are increasing at an alarming rate, that attacks are occurring at earlier ages, that the ladies are catching up with the men. Inactivity is an important risk factor in heart disease. Activity tends to influence in a desirable fashion the other risk factors associated with heart disease.

An urgent requirement in this, and other countries, is an inter-disciplinary study to ascertain why people do not exercise. If the reasons for inactivity are found, it should be possible to formulate adequate solutions.

Recreation

There is an urgent need in this country to investigate the pattern recreation may take in the future, to ascertain peoples' needs and desires. It is equally urgent to undertake a survey of recreational areas and facilities and to classify them according to the kind of recreation for which they are best suited. Areas must be set aside and made difficult of access, so that only those prepared to tackle a hard approach—the climbers, bush-

[1] G. Kirchner *et alii*, "Introduction to Movement Education", W. C. Brown, 1970.
[2] A. W. Willee and C. P. Davey, "Activity and the Australian Undergraduate", *Medical Journal of Australia*, 1970, 1: 223 (January 31).

walkers, mountaineers—will gain entry. Other areas may best be suited to intensive recreation, others will need to be conserved wild, natural, unsullied and beautiful. Waterways must be classified, and here safety may be as important as suitability.

It is obvious that there will be an increasing demand for trained recreational leadership. If school and community facilities are both to be made available for school and community use—and the facilities being provided in tertiary institutions and by industry could also go into the pool—it will be advantageous to have physical educators and recreationists sharing duties and appointed to joint positions. Thus a physical educator may be employed part-time at school and part-time in community recreation. In this way continuity of contact with pupils should make the transition from school to work smoother and with more likelihood of continuity of participation.

Physical Education—A Field of Study

Endeavours in this context should aim at establishing a situation wherein not only will initial preparation be adequate to prepare good craftsmen, but which will also provide for the preparation of the scholars, research workers and tertiary level teachers. Implicit in this is recognition of the need to have physical education better understood at all levels.

There is need to stand off and look at alternatives as they exist in North America, the United Kingdom and Australia.

In the United Kingdom it is possible for a physical education student to obtain his degree from a university in some cases without ever stepping onto the campus. Also, in the United Kingdom, it is possible to study physical education and one other subject only for three years to obtain a B.A. with Honours. Some universities favour course work at Master's degree level, others do not. In many English universities—in disciplines other than physical education—one may study three subjects to equal level for a first degree, or one main subject for Honours and one subsidiary subject. Currently in some North American universities graduate students are doing doctoral work in history and/or philosophy without undergraduate preparation or interest in these areas.

Australian universities generally require a fourth year of study for the student to graduate with honours. In most situations the initial degree course acts as a student sieve: the run of the mill student qualifies and leaves the university, the Honours student remains, the outstanding student continues after his Honours year and proceeds to postgraduate work.

There have emerged outstanding products from all types of course and from all universities, but it would be desirable to consider the advantages and disadvantages of each, dispassionately and on a world-wide basis.

Physical Education and Sport

ICHPER and FIEP have done, or are doing, work in relation to sport and physical education, and the problems associated with the relation-

ship between the two are cause for world-wide concern. The primary endeavour must be directed towards re-establishing morality in games playing. This is a local, national and international urgency.

Finally, it must never be forgotten that the objective of physical education, health education and recreation is promotion of the well-being of men and women everywhere, and that in addition to a common purpose there is much else which is common. Whatever the ultimate specialization there will always be need for some joint preparation.

In all that has been discussed in this paper one must allow for individual deviations from what may be considered standard. Extremes, however, though they may stimulate, are rarely right and are often unacceptable.

Mr. Charles Ebert, Assistant Director-General of Education for New South Wales, Australia, welcomes delegates at the Opening Session.
Left to right: Dr. Evelyn McCloughan, APEA President, N.S.W.; Mr. Lambert. Hamilton, APEA National President; Dr. A. Forbes, Commonwealth Minister for Health; Dr. Klaas Rysdorp, ICHPER President; Dr. Dorothy Ainsworth, ICHPER Honorary President; Dr. Samuel Cohen, Deputy Vice Chancellor, Macquarie University; Mr. Paul Kiefer, ICHPER Vice President; Dr. Carl A. Troester, Jr., ICHPER Secretary-General.

The Need to Popularize Physical Activities

GUNSUN HOH

Superintendent of Physical Education, Republic of China

TODAY I wish to draw your attention to the ever-growing need for popular physical activities for all the people instead of for a selected few. Most of us live in an either highly developed or developing society. A large sector of the population concentrates in big, yet crowded cities. Even in the developing nations, industrialization is coming into being and they can not escape the great migration of peoples into urban societies. The common denominator of such societies is the often observed crowd and suffocating environs of both working spaces and living quarters. Regardless how progressive the city planner might be, his foresight for a spacious and beautiful city scheme is usually overtaken by the rapid growing of urban population which defies the boldest projection. The pattern of life in such a society is invariably hurrying back and forth between one's living quarters and his working area—usually on a piece of machinery, be it a street car, an automobile or a rail coach—but seldom on his own feet. Result, man becomes less and less fit physically due to lack of exercises and his belly grows. Need for planned physical exercises, therefore, becomes more acute than ever, and the need is for all the people, not for a selected few. Better and more athletic activities not only help build a nation's health, but also help solve the problems created by abundant leisure and crowded environs in the wake of industrialization and urbanization.

While the need is growing, we also see the corresponding growing of problems. I do not have to go very far to cite the many inadequate conditions that are familiar to all of us. Usually in a big city we face the dearth of facilities, such as sports fields, playgrounds and stadiums. The lack of trained personnel to promote community action as well as the lack of qualified teaching staff in school physical education programmes leads to either complacency or frustration with the status quo. There is a general lack of interest in research and development in physical education and sports, therefore, the teaching and training methods are as antiquated as the sports and games themselves. Finally, of course, there is the perpetual lack of funds for anything significant.

I shall not disdain to speak of my own country. According to Art. 164 of our Constitution, "no less than 35% of the local government budget should go to public education". The performance of the local governments has been consistently laudable as no one has operated a budget under the constitutional minimum. However, the introduction of nine-year free elementary education in 1968 places upon the local governments an increasingly heavy burden of educational outlays, the available resources for physical education and athletic programmes in general have been pitiably limited.

I strongly feel that physical education and sports activities should be a participating activity that pervades all people of the nation. Instead of merely promoting exciting games of competition, such as highly organized group teams that are played by a selected few, we must encourage thousands and thousands of shouting spectators to be athletes themselves.

The question naturally turns to how we may achieve our objective? Where shall the financial resources come from to promote athletics for all?

I have some suggestions to offer. One is to provide the know-how on physical activities which, as I said earlier, is very much in the lacking in most countries. The provision of trained and qualified personnel is always expensive and even the richest country finds it difficult to fulfil all the needs. Therefore, I suggest an international physical education development service corps be organized by athletically advanced countries whose mission it is to send qualified physical educators to the needy nations to assist them in the development of popular physical activities. The service corps may be staffed by physical education professors, senior coaches of sports and games, or teachers of physical education. They provide know-how in organizing a national development programme, in introducing new methods and help to discover and tap indigenous resources.

In 1965, I almost succeeded in putting together such a service group in a joint effort with the late Dr. Arthur S. Daniels, who was then the Dean of the School of Health, Physical Education and Recreation at the Indiana University. We had then worked out a concrete plan for the team to visit the Republic of China.

Unfortunately, before the plan had its chance to become a reality, Dr. Daniels passed away, and with his death went the plan. May I take this opportunity to present you my humble idea regarding the International Physical Education Development Service Corps which appears to be the answer to the problem of how to popularize physical education, particularly in the developing nations.

My second point is that in this century we have seen many successful international Olympic Games which are held once every four years. The Olympics have certainly achieved their dedicated objectives of promoting international understanding and better athletic performances through competition. On the other hand, we also witnessed competition going to extremes which is very much contrary to the original spirit and objectives as conceived by the founder of the modern Olympic Games.

Many countries now place too much emphasis on national pride or glory and personal cult or achievement to the extent of hero worship. They train their athletes with wanton disregard for the athlete's individual dignity and freedom. The doctrine of "amateurism" becomes merely lip-service, it carries little or no substance. In some countries the athletes are occupied by training on a full-time basis. Their personal freedom is definitely infringed upon. The coach exercises corporal punishment; the women athletes are not allowed to marry. These astonishing malpractices are producing sports machines and sports slaves. Championship may be won, but the athletes themselves are no longer human beings. I can not speak with stronger indignation against such acts of shame.

Looking at the Olympic Games themselves: every four years, the Games emulate the previous ones in variety, in scale of participation, in elaborate facilities and certainly in the ever-important budget. This by all means is good, as this means progress. We cannot hold a human act back and prevent it from progress. On the other hand, because of this elaborate event once every four years, both the sponsor-nation and the participating nations must concentrate whatever resources are available for a selected few and for a brief span of time while these resources, however limited, might otherwise be diverted for popularizing athletics. The temptation to participate in the Olympic Games is great; so is the necessity to preserve the national pride in joining the bandwagon. I suggest that the Olympic Games consider less elaborate events, limit them to basic individual items such as track and field, swimming, etc. The expenses thus saved may go to more meaningful and longer range objectives in individual nations.

Knowing this might be an unpopular suggestion, I nevertheless place it before you because of my strong personal conviction in the value and need for popularizing athletics in all lands.

Physical Education—Tool or Toy?

COLIN E. SPANHAKE

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THERE is a story, no doubt apocryphal, of a class which performed the daily ritual of reciting tables. "Two twos are four, two threes are six", and so on. At the end of the dirge the teacher shot out the question: "What are two sixes, Willy?" "Dunno", answered Willy, "I only know the tune."

We might well ask ourselves how many of the products of our own educational endeavours emerge from the pipeline knowing both the tune and the words. Perhaps it might be more pertinent to ask just what the tune is that they do know. Reports from all over the world lead one to believe that it is probably called "Throw out the Establishment" and is sung to the tune of that old sea shanty "Blow the Man Down". Whatever it is called, it is most insistent, and cannot be easily ignored.

It is commonplace today to hear the statement that the world has "shrunk". It is also no startling revelation to hear someone declaim that "We must work together or perish". But all too often the full implications of these facts of life are either ignored or tucked away in the back of our minds, perhaps in the hope that if we take no notice they will go away.

It will not be easy for some to accept the fact of a world society. Old habits die hard and the most ardent patriots will find the greatest difficulty in reconciling themselves to the changes that are occurring now and those yet to come. But modern means of transport and communication have made national isolation a historical curiosity. ICBMs and nuclear weapons have made all wars everyone's wars. Interdependence now has a universal meaning with far deeper implications than any previous trade pact, and international co-operation has become a necessity for survival. How to achieve this is the dilemma of the age.

On a different level, we have another cause for confusion. In the 17th century, Comenius wrote in "The Great Didactic": "We wish everyone to learn the principles, the causes, the purposes of all the main facts about the world. We must do all in our power to ensure that no man in his journey through life will ever encounter anything so unknown to him that he cannot pass sober judgement upon it and turn to proper use

without serious error". In this century, in the last decade especially, an explosion of knowledge has meant that no man can hope to be an expert on more than one field. Even within the one field there is specialization.

An example of the problem facing the educator today can be found in a statement made recently that it has been estimated that if an organic chemist sat down to read all the work published in his field for eight hours a day for a year, at the end of the year he would still be six months behind; that two-thirds of all the machines that will be in use in the year 2000 have not yet been invented; that the majority of drugs that will be in use in 1980 have not yet been discovered, and that three-quarters of those that are in use now will be obsolete in five years. Of even greater significance for us is the claim that many of the children at present in primary schools will be employed in jobs that do not at present exist.[1]

In the light of these developments—the world society, the "implosion" of knowledge, the clamour for reform—the question that teachers must answer is "How can we help the young to reach adulthood so they can not only cope with their environment, but also shape their future?" Even knowing both the tune and the words is no longer enough. Knowledge and understanding, based on values that are universally acceptable must be developed.

In 1966, the New Zealand Post Primary Teachers' Association decided that pressures and demands of a world in the throes of change would have to be faced, and set out to put their own house in order. A select and widely representative committee was set up to examine secondary school practice in our country and suggest any changes that may be necessary. In 1969, the committee published a report, entitled "Education in Change"[2] the recommendations of which, by comparison with accepted practice of the previous twenty-five years, could be regarded as revolutionary. The first six months of the work of the committee was spent in formulating a basis for judgement by which the curriculum could be evaluated and the remainder of the time was given to receiving submissions from specialists in the respective subject areas.

The "Basis for Judgement" was as follows: "Because the committee's thinking about major educational aims is closely related to its view of the nature of human growth, this statement of major aims consists of a short list of human qualities which education should be concerned to promote at all times. The highest value is placed on: the urge to enquire, concern for others, the desire for self-respect."[3]

Surely these values could be regarded as universal.

The urge to enquire is an innate one. "A biological structure implies functioning; it requires no source of motivation external to itself in order to function."[3] Piaget's concept of the biological basis for the development of "intelligent behaviour"[4] may excite controversy amongst psychologists, but it has significance. Professor A. W. Liley, Postgraduate School of Obstetrics and Gynæcology, University of Auckland, in a recent address to the Auckland Branch of NZAHPER, suggested that the rate of learning is highest at birth, maintains a high level for a short time and then begins to decrease. From a physiological point of view there seems to be no

reason why the rate should not remain at a steady level throughout life, barring accidents, of course. But what actually happens is that inhibitory factors are met soon after birth and increase steadily as mobility and "socialization" progress.

Concern for others cannot be expressed only in the form of polite enquiries about health, a superficial acceptance of conventions and rules. It involves a deep commitment based on acceptance of the intrinsic worth of all human beings, a feeling of personal responsibility towards society, which will allow respect for the rights, opinions and actions of others to be maintained at all times. In addition to this passive form, concern for others means the readiness to act positively, sometimes at the cost of personal sacrifice, to maintain the inherent dignity of all life.

Self-respect depends largely on the individual's view of himself. But it is doubtful whether it can ever be achieved in its highest form at the expense of others.

The report "Education in Change" suggests aims for the educator which are well worth noting. They are:

1. To help young people to acquire values which will aid their individual growth and social consciousness.
2. To develop their capacity to enquire in representative fields of study.
3. To develop their ability to relate the parts of their educational experience so that they can see this experience as relevant to their lives.[5]

The report also unequivocally adopts the attitude that "The curriculum should therefore be thought of as a vehicle for the attainment of goals and not as an end in itself".[6]

Where do we stand in relation to these aims, these values? Are we concerned only with the ends, the toys, so to speak or can we use our craft as a tool for achieving these aims and values?

In New Zealand, on our ability to show that in both philosophy and practice we measure up, may depend our future place in the secondary school curriculum. While the report is not official policy of the Education Department, the favourable reception it has received throughout the country indicates that at least it will strongly influence the thinking of all concerned.

Physical education has developed values and objectives with which few would disagree. The caretaker role, the skill development role and the socializing role are all part of our stock-in-trade and need neither elaboration nor justification.

But if we weigh our practices against the values and aims suggested by the Post Primary Teachers' Association, it should be apparent that not even the most dedicated physical educator can remain complacent. Do we consistently, and with intent, deliberately promote the urge to enquire, concern for others, self-respect and respect for others? Do we do all that is possible to enable our pupils to see the activities they participate in as being relevant to their lives?

I suggest that there are at least two areas in which we are not doing all that could be done to develop these values. I go further; in the use of "direct" teaching as the major method of achieving our goals and by using organized competition as a motivation principle, we are more often than not reinforcing the inhibitory factors that Professor Liley has mentioned.

There is no doubt that there are many situations for which there is no substitute for the "direct" approach. The leading exponents of the exploration method, the teachers of modern educational gymnastics, do not exclude "direct" teaching from their methods, advocating, as we all know, the judicious use of "direct", "indirect" and "limited" approaches. It is also readily conceded that it is the quickest way to help the child to achieve the immediate objective, that it is necessary for the growing child to learn to conform to the dictates of higher authority and that in helping the child to achieve an immediate goal we help him to meet the standards of his peer group and therefore help to establish his self-respect. It would appear then that there is ample justification for leaving well alone.

But all these arguments are concerned with immediate performance, the carry-over value of which is often largely fortuitous, that is, if there is a carry-over at all. In the last few years I have had opportunity for many discussions with young men and women in senior classes in our high schools. Most could give, chapter and verse, all the reasons for maintaining physical activity at a high level throughout life. But there was an obvious gap between knowing and doing, an obvious lack of commitment to the principles they knew about. They were regurgitating what had been told them. I see in this lack of commitment a lack of deep understanding, the kind of understanding, the revelation, that comes from solving one's own problems, mastering skills through one's own volition and from finding out for themselves the give and take necessary for effective social relationships.

By contrast, our experiences during the compilation of a primary school handbook of physical education during the early 1950's were quite exciting. We let it be known to schools that we required "indigenous" games for inclusion in the book. Many hundreds were offered and 120 were accepted. The tremendous zest which accompanied the "creation" of the games was obvious. But what was more notable was that even the most complicated games were developed and played without the necessity for umpires or referees. Compare this attitude with the complicated rule books of adult sport, the learned panels of appeal judges without which an international competition could not function. The pupils had discovered for themselves that co-operation, responsibility and conformity to the agreed rules were necessary for the game to proceed.

Direct instruction gives children little opportunity for making genuine choices. The teacher says in effect: "This is what I want you to do. This is how you are to do it. Now do it." Various incentives are employed to motivate effort, and, perhaps variations of the directions are used. But the effect is the same. For the moment, at least, the goal has an absolute value for the child. He endeavours to imitate the picture that the teacher

has conveyed to him and his self-image will depend on his success or failure. If the child is both wise and capable, he follows the teacher's directions to the letter and achieves the goal. "That's that. What next, Teacher?" If the child lacks motor intelligence, he may not achieve the goal, and even if he is praised for his effort, cannot help placing himself in some sort of rank order in relation to his peers, often with disastrous effect on his ego and resultant later rejection of the activity. If this process is repeated sufficiently often, the urge to enquire will depend almost entirely on the force of the teacher's personality, or be non existent.

I am sure that there will be many who will claim that I am overstating the case. But I am not alone in believing that the continual use of direct instruction is an inhibiting factor in learning. Discussions have been held in Auckland in the last two years on the probable causes of the high "failure" rate amongst first-year students at the university. As a result, many of the contributing high schools have instituted "self-learning" classes (my adjective), at the senior level of the school. Pupils choose a course of study and are guided, not taught, by the teachers. They discover for themselves what they want to know. They find out how to find out.

Now while this is an excellent move, it appears to me to be a rear-guard action. It should never have been necessary to be concerned that 18-year-olds were unable to organize their learning. It must be obvious that many years of inhibiting the urge to enquire must have occurred, and it appears that the methods used to achieve set goals may be the cause.

The responsibility does not rest with physical education alone, but must be shared with most of the other subjects. The total school climate must be adjusted to respect the individual differences in children, their different rates of learning, and their different levels of achievement. Art teachers have adjusted to this need several decades ago, science teachers can be credited with using "experiments" since the turn of the century, and even earlier, and while their early methods could be described as thinly disguised subterfuges to arrive at predetermined goals, their modern labs are bursting with an atmosphere of exploration and discovery. The "New Maths" is also almost wholly the active exploration of relationships. Modern educational gymnastics have advocated methods for over twenty years now which would meet the needs I have been discussing. Unfortunately, for many the mention of the name "Ed. Gym." is an anathema. For some curious reason, some likeable, friendly people go purple in the face at any suggestion that Ed. Gym. may have something of value for all. I declare myself publicly as being a staunch believer in the judicious mixture of "direct", "indirect" and "limited" approaches of the Ed. Gym. people, approaches which incidentally have been used by some of the better physical education teachers for many more years than Ed. Gym. has existed. In doing so I reserve the right to remain suspicious of many of the claims sometimes made for the "movement" as a whole.

The use of competition, either in its direct form or in the form of rank order ratings, has long been an accepted procedure in education.

Competition is regarded as one of the facts of life, an essential part of our individualistic social system. Our whole society appears to be based on it. Therefore the young should be faced with it as soon as possible

so that they may learn to cope. One does not need to look far for examples of the beneficial results of competition. The race to the moon, the huge corporations which provide employment for millions, and sometimes huge grants for research and philanthropic works, the rise in the standard of living, modern communications and transport, are all benefits that arise either directly or indirectly from the principle. In our own field we can point to the magnificent performances in track and field events, gymnastics and other sports that have arisen as a direct result of organized competition.

However, there is another side to the picture. Some of the greatest works in art, music and literature came into being, not from competition, but from an inner drive to achieve, to perfect. One could go further and state that the majority of discoveries that have been beneficial to mankind were also motivated in this way.

The essence of competition is self-seeking. It often forces individuals and groups to behave in a manner inconsistent with principles of mutual respect. It often promotes arrogant behaviour, despite our efforts to instil the spirit of sportsmanship and fair play.

Relatively few children—mainly those who are already confident and successful—show marked progress in a competitive situation. Many, particularly those at the bottom of the rank order, experience varying degrees of failure and thus have artificial barriers placed on their growth. The gap between the skilled and the unskilled tends to be increased, with the result that few at the lower end of the rank will attempt the impossible. The rank order system can certainly promote a drive in the able to get to the top, but it also tends to make the objective the goal and learning becomes incidental.

Susanna Millar in her analysis of current thought on the psychology of play states that "Exploring and playing with objects 'for their own sake' occurs precisely when the animal appears most comfortable, and least driven by physiological needs or their derivatives".[8] She also reports Tolman's and also Hull's theories that reward aids performance rather than learning.[9] Mace, discussing "Human Motivation and Incentives" in 1961[10] also suggests that true understanding comes only when man is freed from pressures.

We might well ask ourselves whether the promotion of the "competitive spirit" is necessary or desirable as a tool for learning. We would also be justified in questioning whether competition assists the achievement of the values and aims proposed by the New Zealand Post Primary Teachers' Association. And if we extend ourselves further and ask whether or not competitive sport is the best means of promoting international friendship and understanding, the following news item, quoted verbatim from a New Zealand television report on the eve of the final of the World Cup soccer match between Italy and Brazil, may be used as evidence: "In case Italy wins, armed guards have been placed on all Italian buildings in Brazil."

In Auckland we have given some thought to these views over the past few years and have done a little experimenting. In dance we have annual displays of compositions, most of which are the "creations" of the pupils. At present it is mildly competitive in that values are given for

answering the theme, use of levels, focus, space and other technical aspects of dance. But the choice of theme, music and the choreography are left free so as to encourage the maximum exploration of the possibilities. Some attempts to develop gymnastics through application of the laws of motion by the pupils have been made, but as yet, the shackles of the past are impeding progress. However, in the area of "Learning to swim" we feel that we have achieved, to some extent, the aims I have outlined.

With 320 pools at the moment (one-sixth of New Zealand's total), and aided by the lack of a strong competitive environment, we have been able to experiment widely. Our approach has been based on the principle that the pre-natal, amniotic fluid, environment preconditions the child to accept swimming as a natural activity as soon as various reflexes and physical abilities begin to operate. From the time the child becomes mobile, inhibitions or preconceptions are developed through parental and public warnings on water safety. On entry to the school these must be overcome either through direct teaching or through the use of the beaches in our comparatively new "L"-shaped[6] pools. The beaches allow maximum exploration of the qualities of the water and with minimum guidance the pupil can develop rapidly a relaxed prone position. From this point the teacher becomes a coach. We, as advisers, are endeavouring to develop in teachers the habit of asking the right questions in the right way, rather than directly telling the child what to do. As soon as the pupil is sufficiently efficient he is led to find out simple survival techniques and techniques for saving others. The results have been outstandingly successful.

In this approach the urge to enquire is promoted, self-respect is developed through achievement of a skill, and concern for others is expressed in a very real and practical manner. With no one in the Auckland peninsula more than 30 miles from the sea, and with more than 33,000 pleasure boats for a population of 700,000, "relevance to their lives" is obvious.

The changing world will demand of us a more active concern than we have ever needed to show in the past. It will force us to adopt values and aims consistent with the development of a world society. I have suggested that at least two of our previously acceptable practices will need to be re-examined critically if we are to actively propagate human relationships at the highest level.

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The Development of Sports Facilities and Their Equipment

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Introduction

1. CLOSE EXAMINATION of various Congress reports, of the results of study groups and seminars and discussions with experts at home and abroad, always lead to three problems:

(*a*) In spite of all the efforts of those responsible for school sports, they did not yet succeed in decisively improving its *general situation* nor, in noticeably elevating and securing the status of sports in the sphere of school and university.

(*b*) Besides the fact that many schools are short of physical education teachers, the quality of the present-day physical education teachers is all too often unsatisfactory. Their training does not always meet the requirements of our society and their further education often reveals a lack of straight-forward planning.

(*c*) In many countries and schools the spatial conditions regarding physical education are so often inadequate, so that the objectives of sports are gravely hampered. That is one of the reasons why the integration of sports into the modern concept of education is being questioned.

2. It would be highly interesting and informative to examine the interrelationship of these three problems. My task, however, is only to comment on spatial conditions and demands which we must make on our county-parliaments and the community with regard to the modern school and modern school sports. My speech will be followed by a series of slides which will demonstrate to you my country's efforts at creating sports facilities for children and adults and providing the appropriate equipment.

Now to the Theme Itself

I. Types and Distribution of Sports Facilities for Schools

(*a*) The designers of sports facilities must not only consider the requirements of the school but also the out-of-school demands, including health precautions as well as leisure time and recreation.

(*b*) The tendency towards large school campuses requires a sports centre together with the school centre.

(*c*) Such a sports centre should have outdoor facilities, gymnasiums, facilities for leisure and recreation activities, as well as for special activities (tennis, judo, riding, dancing, etc.).

(*d*) Facilities of a larger area are preferable, as the child's activity and play instinct should not be restricted, and as the size of our present halls has proved too small and therefore inadequate.

The following guiding principles in relation to the whole population are applied in our county:

3·5 qm. (square metres) playing area per person.
0·1 qm. in gymnasium and sports hall per person.
0·1 qm. in outdoor swimming baths per person.
0·1 qm. in indoor swimming baths per person.

We have still got a long way to go before these calculations can be realized, but we have to keep on putting these demands forward, so that they are really taken into account by both county and community, when plans are being made. Recently, nursery education has been brought into the planning, as it has become evident that the old-type kindergarten no longer satisfies the child's demands.

(*e*) With regard to the school sports centre, we have to see to it that the facilities are planned on a scale which permits competitions according to the international rules of the Sports Associations. The schools must not abstain from the general demands for controlled support of high-efficiency training.

(*f*) The facilities should, in the first place, be constructed so as to be highly functionable and so that costs for maintenance are kept down. In order to attain this, it is recommended to form a committee of experienced physical education teachers and architects who should then work out functional plans for all sports. They should also suggest to counties that a larger number of these model facilities be built by them and then bought by the communities. Thus we could save up to 30% of the costs and gain excellent sports facilities at the same time.

Results

The development of sports facilities has made great progress in many countries, and no doubt this is partly due to the instruction given in teacher-training courses on this subject.

Those times seem to be past when sports facilities were treated as a matter of secondary importance in the construction of schools. Sports facilities form part of the whole structure just as sports play a role in the complex mandate of the school.

The development of sports facilities will progress further, just as sport develops and changes within our society. We must keep a close eye on this development and continually look for new designs, which are suitable to the school system at the time and which satisfy the demands of out-of-school sports.

II. General Principles Concerning the Planning and Construction of Sports Facilities

A committee consisting of county officials in charge of the sports section in co-operation with the Cologne Institute for the Construction of Sports Facilities has worked out the following principles:

- The construction of sports facilities for schools takes priority over all other sports facilities.
- Grants for new school buildings should only be given if the required playing fields and sports grounds are completed simultaneously with the school building itself.
- Sports facilities for schools (gymnasiums and outdoor facilities) must be situated within easy reach of the school building.
- With regard to the total number of swimming baths to be provided for the public, these should, where possible, be attached to school centres. Transportation should be provided for those schools which are not immediately supplied.
- The modern organization of school sports requires facilities which make possible various activities for class units as well as for more differentiated organizations (group-teaching, etc.). Training facilities should be provided for events provincially or locally limited which have not yet been encouraged.
- A close connection between schools (school centres) and sports facilities (sports centres) should be the aim. If this connection in or close by the school area cannot be achieved, school demands take priority on the grounds of physical education.
- In addition to physical education at school, sports facilities for schools should satisfy the various demands of out-of-school activities: club training sessions, the training of the best competitors, sports meetings and recreation activities of the public. Therefore, they have to stay open for use on evenings, week-ends and during the holidays.
- On the other hand, it must be emphasized that the demands of the schools, too, have to be considered, when open community sports facilities are being built.
- The general principles for the use of sports facilities have also to be taken into account, when the demand for school sports facilities is being considered and the size of the individual parts of the unit is being determined. If the demands of the different training groups (schools, clubs, members of the public) are co-ordinated, this will result in high efficiency, lower costs for construction and maintenance of the grounds and thus guarantee that the funds for sports are spent effectively.

- Educational needs and the competition rules of the associations united in the DSB are the decisive factors in the calculation of demand and size of school sports facilities.
- Within the calculation of the requirements of general education and vocational schools, additional extracurricular meetings have to be considered as well.
- The teacher must be able to give his lessons regardless of the weather and, therefore, both *outdoor facilities* and *gymnasiums* must be available.

III. The Calculation of the Requirements for Sports Facilities

The committee mentioned in the previous paragraph has also worked out general rules for the demand and the size of gymnasiums, outdoor facilities and recreation centres. These rules differ greatly from earlier rules, but they certainly satisfy the demands of modern sports.

Gymnasiums

Ten full-time classes or 15 part-time classes require one gymnasium each.

The normal size of a gymnasium is 15 by 27 m. of effective area. This is relevant in view of sports clubs using the gymnasiums. Gymnasiums measuring 12 by 24 m. should be built in emergency cases only. Gymnastic rooms and small gymnasiums do not satisfy the demands of physical education.

The construction of large, partitioned gymnasiums must be specially supported. Large gymnasiums provide for all forms of school sports, particularly team games. These gymnasiums measure 27 by 45 m. (equivalent to three halls 15 by 27 m. each) and 21 by 45 m. (equivalent to one hall, 21 by 27 m., and one hall 21 by 18 m.). Each hall, including partitioned halls, must provide fully for all forms of physical education.

In addition to the construction programme of gymnasiums, the inclusion of keep-fit rooms and, if possible, other special rooms, is recommended.

Outdoor Facilities

All types of schools must be supplied with playing grounds and athletic facilities. The space of the outdoor facilities has to be arranged so that single classes can each practise in four groups.

Playing Fields

Five full-time classes or 7·5 part-time classes should be provided with at least one small playing field of 20 by 40 m. useful playing area. One big playing field (artificial or grass) measuring 68 by 105 m. equals two small playing fields.

The small playing fields should have a water-proof, elastic surface needing little maintenance, long-lasting playing field marks and sockets for goals, posts, etc., where possible, for soccer, handball, basketball and volleyball and, if required, for further games.

Athletic Facilities

Facilities are required for running, jumping (long and high jump; if need be, for pole vault), throwing (ball throwing and, if need be, for discus and javelin) and shot put.

The running facilities (four to six tracks) should allow for races up to 100 m. If possible, a 400-m. round track with the necessary marks (relay, hurdling, etc.) should be constructed. If a round track which satisfies competition rules cannot be provided then long-distance running tracks should be made available.

Long jump, high jump and pole vault facilities should, in principle, be at a distance from each other.

Long jump requires a pit measuring at least 8 by 10 m. with four running tracks.

For high jump, individual facilities with foam rubber mounds are required. The same goes for pole vault facilities.

For ball throwing, the playing fields mentioned in paragraph 5.3.1 should be used. Larger sports grounds should be provided with discus and javelin facilities. Facilities for shot put should have a starting area of about 3 by 20 m. and a shot put area about 15 m. long.

No sports centre should be without a gymnastic field and an area for obstacle games.

Indoor Swimming Baths

The calculation of the needs must be based on the principle that swimming lessons should be given one hour weekly for each full-time class and half an hour weekly for part-time classes.

In swimming baths of 8 by 25 m. onwards, two classes can be taught simultaneously. It should be possible to walk around three sides at least of either class section. More than 30 classes need an additional bath measuring 8 by 16·67 m.

Swimming baths should either be close by the school at a moderate distance (up to 500 m.) from the school or made attainable by means of transport. Swimming lessons with simultaneous public swimming hours in the same pool is too much for both groups. School swimming baths should be equipped with an adjustable floor level.

Recreation Facilities

One of the duties of the school is to acquaint its pupils during their school days with sensible recreation activities for their later working life. Therefore, a great variety of activities should be offered. It has been proved on numerous occasions that sport is well qualified to reach this end and can arouse the pupils' responsibility and co-operation outside school.

IV. The Equipment of the Sports Grounds

Modern teaching methods call for differentiation of pupils, according to their inclinations and performances as soon as their stage of development allows this.

In order to gain the highest possible *intensity of activity*, a great amount and variety of equipment is required in order to satisfy the pupils' activity demands and the demands for high efficiency. One cannot, of course, compile a uniform equipment catalogue for all countries, as the climatic conditions, the whole complex of exercises, and their underlying intentions vary to a high degree. As a general requirement, however, such equipment must be at one's disposal, which allows a general basic training and sports exercises in the gymnasium, as well as on outdoor grounds. *Adjacent rooms* should be constructed for equipment, so that all the available playing and sports area can really be used efficiently and so that practising is not hindered by equipment. With consideration towards requirements of our county, colleagues from my association have worked out a list concerning the necessary large and small equipment, which I have included at the end of my speech. It would take too long to comment on this list here. If you can spare the time you could compare it with the requirements worked out for your own country and schools. Thereby you might gain some new ideas.

V. Sports Facilities and Health Education

The designers of sports facilities for schools and the authorities behind them have, for a long time, overlooked the fact that physical education implies health education, and that therefore certain conditions must be fulfilled. The regulations for the construction of sports facilities stipulate *hygienic facilities* too; but, upon examination, we often find that they do not come up to standard. As yet, I am unable to give you a complete list of such facilities and equipment, as the committee formed for this very purpose will need a few more months to conclude its report. Let me just mention that representatives of the Public Health Administration form a part of this committee, as this problem in particular urgently requires the co-operation of all the various relevant institutions.

VI. Conclusion

I admit that my demands stated here are almost maximum demands and will cause high costs. If, however, we deny the teacher and pupil the possibility of working according to the modern principles of teaching and learning, then we should not be surprised if they do not meet with success. We are also concerned with this success at this congress in Sydney and I do not think that we have only a duty to support but also a right to demand.

Equipment

A—*Large Equipment:*

In consideration of the present number of pupils in classes, they should be supplied with *four sets* of each of the most important large equipment. The following equipment is required:

Horizontal bar: four sections with equipment which can be lowered below the floor surface; if need be, horizontal bars inserted into sockets, with light metal uprights.

Parallel bars (four): type and size according to the type of school. If used by boys and girls' classes one pair of competition parallel bars, two pairs of multi-purpose bars (combined competition and asymmetrical parallel bars) and one pair of junior parallel bars. Fixed castors for conveyance are necessary.

Boxes (four): normal type (five sections, height 1·10 m., with fixed castors; small type (0·50 by 0·70 by 0·40 m.), four also.

Buck horses (four): pupils' size (height adjustable from 0·90 onwards).

Vaulting horses (two): normal size (height adjustable from 1·10 onwards).

Spring boards (Reuther type): four at least.

Mini trampolines (four).

Rings (four pairs).

Benches (four).

Mats (16 on two mat trolleys).

Soft mattresses (two).

If required: gymnastic mats, rubber runners (non-slip), jumping table.

For girls' classes:

Two balance bars meeting competition requirements.

For competition groups and clubs:

One horizontal bar, to be anchored.

One pair of competition rings.

One pair of asymmetrical parallel bars (Reuther type).

The following gymnastic equipment should be permanently fixed:

Climbing poles (six at least).

Ropes (for climbing and swinging).

Wall bars: two to four double sections, swivel-mounted, with a locking device.

Window bars.

B—*Games Equipment:*

For basketball: swivel mounted or hinged basketball target boards and practising boards.

For volleyball: slide rails on the walls or posts on all sides with nets and tightening mechanism.

For hall-handball: dependent on the size of the gymnasium.

C—*Additional Equipment:*

High jump posts (four), netball posts (if required), 12 to 16 marking posts or border line flags with iron bases, container for magnesia.

D—*Equipment for Partitioned Gymnasiums:*

Each first and third hall must be fully equipped. Each second and fourth hall can make do with a limited amount of equipment. The same goes for schools with several detached, but close-by gymnasiums. This limited equipment should consist of: four boxes, four elastic spring boards,

twelve mats on two-mat trolleys, four benches, climbing poles or ropes, wall bars; additional to this, an extra piece of Olympic gymnastic apparatus (horizontal bar or parallel bars), four lots.

E—*Small Apparatus*:

The small apparatus, regardless of the use and time allocation of the sports facilities, must lie in the hands of the individual school authority. Any other method should be rejected. Additional to the first set of equipment, the schools should regularly be given grants for maintenance and replacements, according to demands of the moment. Small apparatus should be locked away in cupboards. The *amount* of small apparatus should be in relation to the size of the school and the number of pupils in each class. In the following list the requirements are calculated according to *gymnasiums needed by the school*, regardless of where the equipment is used (cp. the calculation of required gymnasiums). With regard to the number of pupils in a class, the following is required:

A set of 40—complete equipment (i.e., each pupil of the biggest class to have one piece of equipment).

A set of 20—normal equipment (two pupils to one piece of equipment).

A set of 10—basic equipment.

Should there be more than 40 pupils in the biggest class, the above-mentioned figures should be increased accordingly.

(*a*) *Each* hall should be provided with:

Gymnastic balls (7·5 Zoll.), 40.
Skipping ropes, 40.
Elastic ropes, 4.
Relay batons, 8.

(*b*) Each first and third hall should be provided with:

1. Balls:
   "Medicine" balls (2000 and 3000 g.), 20.
   "Medicine" balls (stuffed, 800 and 1000 g.), 10.
   Flinging balls (mostly 1000 g.), 10.
   Small balls (80 g.), 40.
   Small balls (200 g.), 20.
   Footballs, handballs, volleyballs, basketballs:
   (*a*) as basic equipment of each, 10;
   (*b*) where there is specialization in two games or more, of each, 20.
   If these games are often played on tarmac play grounds sufficient reserve equipment should be available (plastic balls, e.g.).
   If required: Fist balls, quoits, table tennis equipment, badminton equipment, Indiaca, etc.
2. Gymnastic equipment:
   Sticks (if required), 40.
   For girls' classes:
   Hoops, 40.
   Clubs, 40.

3. Athletic equipment, etc.:
Shots. (2-3-4 kg.) together, 20.
Shots (5-6·25-7·25 kg.) together, 20.
Rubber shots for use in gymnasiums if required.
Sand bags, 10.
Disc-loading bar bells (short and long dumbells) if required.
Practice hurdles (with two-sided rests), 10 at least.
Competition hurdles if required.
Javelins (500, 600, 800 g.), 4 at least.
Discuses (1, 1½, 1¾, 2 kg), 4 at least.
Hammers, stones, poles for pole vault if required.
Stop watches, 8-12.
Measures (different lengths), 6-8.
Starting blocks, high jump posts, high jump ropes, high jump bars (light-weight metal), clap boards, starting pistols, pole measures, tambourines, long skipping ropes, tug-of-war ropes, whistles, team bands (4 different colours), numbers, air pumps, ball grease, markers for putting into the ground, score boards, ball nets (all foregoing if required or according to facilities available).

(*c*) The equipment required for swimming lessons is best-kept close at hand and administered accordingly.
If required:
Swimming boards, swimming bars, etc.
Swimming wings and other floating apparatus.
Diving rings, diving plates, etc.
Balls for water ball and other games.

(*d*) Equipment for winter sports:
If winter sports are possible, or if a school attends skiing courses regularly, then a series of winter sports equipment must be available (e.g., skis, sticks, skates).

RESEARCH

What We Know about Man and How He Moves: From a Kinesiological Viewpoint

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SEVERAL scientifically-minded physical educators in the United States of America, classified as kinesiologist (biomechanics) experts, are making a determined and well planned attempt to study man carefully in a movement environment. A few have at their disposal or for their use some rather sophisticated equipment. Some use apparatus from laboratories of other disciplines and professions on their campus, and some have developed their own laboratories that are beginning to rival in magnitude those found in the physical and biological sciences departments.

Each of the separate laboratories tends to reflect the philosophy and personality of the senior professor(s) at each institution. My professional friends tell me that the biomechanics' laboratory and the equipment we have at Indiana University reveals what they think I believe about how to study man in action. To say the least, our interest and expertise in biomechanics at Indiana University leans toward the use of cinematographic and electronic equipment. (This doesn't include the stress physiology and motor learning laboratories which have their own equipment.)

We have another concept worthy of mention. We select as our model(s) only the best performer(s) we can secure as a subject. We hope that these individuals are the best in the world.

With the advent of the computer, the kinesiologist is now able to use many subjects and to have each subject repeat his actions many times. In other words, model actions for each individual and for groups may be established. As the academic training of those entering this area of

specialization is increased, especially in the field of mathematics, mathematical models of performance and predictions of ultimate performance will and are being done.

In a real sense, the future top kinesiologist (biomechanics expert) may well be one trained in mathematics, neurology, anatomy, physics, mechanical engineering and, last but not least, physical education. Perhaps nothing is more of a handicap to the scientifically-minded investigator of man's physical movement than that he is not intimately familiar with how and why man moves as he does from a first-hand acquaintance. The future looks bright in this exciting area. . . .

Some definitions and comments about man and his system are presented here:

Kinesiology (derived from *kinesi* meaning motion, and *ology* meaning science of) is a science, an organization of information which deals with motion; it involves man in this context. Sometimes it refers to an undergraduate course of study in the physical education major curriculum. Too often its content is actually applied anatomy.

Biomechanics is the study of the mechanics of living organisms (man), especially under conditions of sudden, violent or prolonged strain such as experienced in sports. It involves the application of scientific principles to the calculations of the actions made by the living creature.

In a sense, mechanics tell most of the story concerning man's action. We do not use the term *form* any more; we only refer to the mechanics of action. If a new method of performance is developed, then we test it in terms of mechanics. The word form used in such a setting is obsolete.

Design of man. (He is shaped like a cylinder or prism.) He is classified as an *engine* which involves transportation of food and electrical impulses (messages) to the appropriate segments. He is a creature of *habit* and *rhythm* of movement. For example, the sound he makes may be recorded and transposed into musical score. Gymnastics in Europe is taught by the "count" or rhythm method. This is especially true for the aspiring young performer.

Man is the *creative response* of living creatures to the challenges of his environment through the ages.

There is even an embryological basis for the way man moves. As an embryo, he acts on and then responds to his environment; hence, individual differences begin early.

He has a hierarchy of accomplishing locomotion which is in a sequence that is interrelated and dependent. These movements are: swimming, crawling, climbing, walking, running, jumping and throwing; followed by a combination of any or all of those listed above. In the combination of movement, definite learning must take place, whereas many of the lesser complicated actions, called fundamental movements, have a reflex action base.

Man has three main systems with which we should be concerned; this is not to discount the value of the others since they have a very large influence in governing his physical motion.

The three are as follows: the nervous system, the muscular system and the skeletal system.

Sample special biomechanical equipment used at Indiana University in the study of man's actions:

Instruments: electro-myography recorder, telemeter, computer, X-ray (roentgenography) motion apparatus, cameras, speeds from 64 to 2000 (5000) fps, light tracing equipment, force platform, motion analyser, electrogoniometer, stroboscopic equipment, mirrors and beam splitters, holograph (laser beam), electronic track-starting machine, Elgin table, special photoelectric cells.

After we have studied man in a variety of situations, with the use of many devices, what have we found out that may be applied to a teaching and coaching situation? Ten samples of application are included as follows (we have many more but space does not permit their inclusion):

1. There is no forward body lean (trunk inclination) in sprint running after acceleration occurs.

2. Elbow flexion, sideward elbow extension, and then medial arm rotation, and finally hand pronation take place in the throwing of a relatively light object, i.e., the javelin and football.

3. The part of the body to move first in the sprint start is the rear foot and not the hand as previously believed.

4. Mass movement patterns of neuromuscular facilitation are spiral and diagonal in nature. The interrelationship of the nervous and muscular systems are very evident in movements involving the upper trunk.

5. The direction the elbow and knee point in basketball shooting and running, respectively, are one of the true indications of successful or unsuccessful performance. In a pushing action, such as is done in shooting a basketball, the best performance occurs when the elbow is directly toward the basket during the preparation phase.

6. The advantage of being flexible in the pelvic region is almost self-evident in kicking a ball for distance and in hurdling. In fact, a punter in American football should take the same exercises as a hurdler in order to gain the degree of flexibility he needs.

7. It has become more and more evident to me and my students due to the rotational component in high jumping that the high jumper of the future will be a tumbler and may take a lesson from the animal kingdom and be a sprinter too, since the swiftest animals are the highest and longest jumpers.

8. Man is one-eyed, one-handed, and one-footed in sports. That is, one of these is dominant over its opposite. Observe a basketball player in a shooting position. He actually aims as one does in target pistol shooting.

9. When man starts a movement and is fully committed, both mentally and physically to the act, he can't stop it but can only interfere with it.

10. In order to move a limb in one direction, he must move it first in the opposite direction. For example, to extend the arm, he will first flex it. This is done in order to put the ultimate contracting muscles on a stretch and to also apply the force needed during the longest time.

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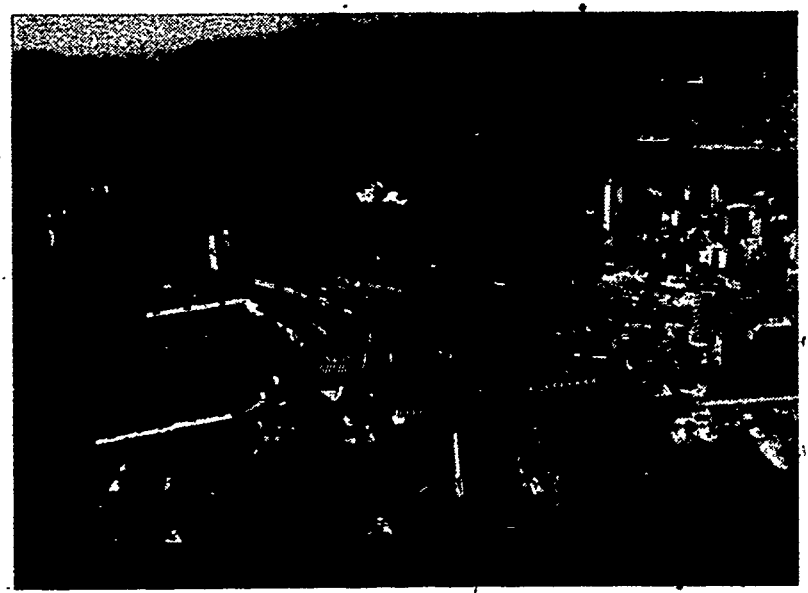

Sydney, Australia, host city for the Thirteenth ICHPER Congress.

Personality and Perceptual Factors in Motor Performance

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Preface

THIS PAPER seeks to define the role of personality and perceptual factors in motor performance within a broad super-ordinate structure of motor style reflecting a person's preferred modes of motor expression.

Personality has been interpreted in terms similar to those of Leeper and Madison*, and is taken to refer to only a part of the whole life of the individual, to be rather heavily social in orientation and is particularly concerned with things of personal emotional significance. It is reflected by the individual's characteristic ways of behaving in given situations.

Perception has been interpreted in terms of Gibson's† discussion of perceptual learning and development. Perception as a process is exploratory action; it is regulatory, selective and searches the environment in the service of adaptive, economical action.

While personality and perception are the focus of the study their interaction with other psychological, physical and social factors in determining motor style is acknowledged as a basic assumption of the theory.

The theme of the Congress has been designated as *New Endeavours* and that of this session as *Current Research Implications for Programme Development.*

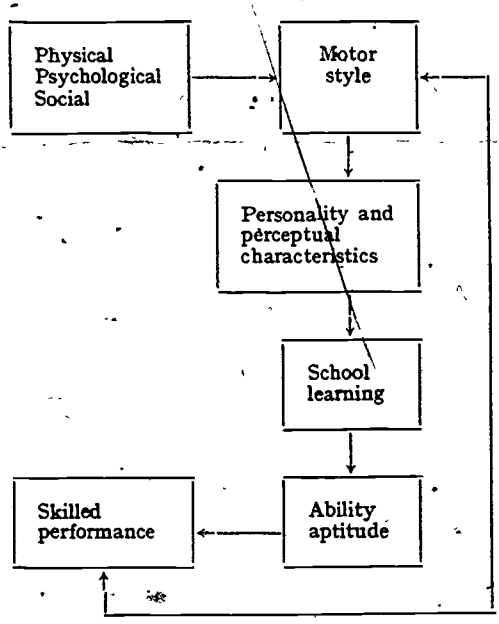
I intend to take the opportunity provided by these two themes to report a field research study undertaken in a Sydney metropolitan high school and to develop the wider perspective under which it was developed. Both these undertakings are important in their own right. One reports field research, objective and statistically analysed; the other, develops in

* R. W. Leeper and P. Madison, "Toward Understanding Human Personalities", Appleton-Century-Crofts, 1959.

† E. J. Gibson, "Principles of Conceptual Learning and Development", Appleton-Century-Crofts, 1969.

tentative terms a concept of motor style which, if proven to be tenable, carries clear implications for both research and practice.

The research study itself is molar in orientation and examines the relationship between selected personality and perceptual factors and gross motor performance variables. Within the study personality and perceptual factors are assumed to have organizing and directional properties which act as mediating structures in determining preferred modes of motor expression and performance. These modes of preferred activity comprise a super-ordinate structure, tentatively designated as a person's motor style. Although the study itself cannot comment upon this broad concept or the causal nature of the specific relationships examined, the study attempts, in a limited sense, to bring into focus the role of non-physical factors in motor performance.



I have utilized the *New Endeavour* theme to elaborate this concept of motor style and to suggest its application to teaching by examining the role of personality and perceptual factors in motor learning. To provide this theoretical perspective of study the relationships between the motor style concept, the specific elements of this concept examined in the study, their place and application within a school and physical education context will be discussed in the first part of this paper. The reader should be in a position to trace the thread of personality and perceptual factors from broad theory to skilled performance and to interpret the research reported within this perspective.

The relationships between the theoretical perspective can be portrayed schematically.

The second part of the paper will report the study and will attempt to draw implications to practice utilizing the framework developed in the first section.

PART A: GENERAL FRAMEWORK

1. Motor Style

As previously explained, the research undertaken is molar in orientation, field in nature and concerned with gross motor skills rather than skills associated with the experimental laboratory. It should be no surprise, therefore, that a concept which attempts to unify the diverse classifications of motor performance should be presented. The concept is presented in full knowledge that the trend of research conducted by eminent researchers such as Fleishman and Henry and their associates suggests that motor performance tends to be task specific rather than generalized. No attempt at this stage to argue the position is made although it will be raised again in the discussion of results.

This paper assumes that the interplay of physical, psychological and social factors determines a person's range and pattern of motor activity which, in turn, becomes identifiable as a preferred mode of motor expression. These preferred modes of motor expression comprise a superordinate structure, tentatively designated as a person's motor style. This notion supports the idea of a "g" factor in motor performance and reflects such formulations as Adler's style of life, Erikson's life pattern and recent research into cognitive style. Within the concept, personality and perceptual factors are assumed to have organizing and directional properties and to act as mediating structures in determining preferred modes of motor expression and performance.

The notion of motor style also serves to emphasize that non-physical variables may be equally as important, if not as obvious, as physical factors in determining a favoured or characteristic pattern or style of motor activity.

The concept is not new and seems to be closely related to what Bambra referred to as "an individual's own most natural modes of moving".[1, p. 94] However, whether new or not, the concept does appear to recognize that the person tends to act as a unity; that while many factors compose this unity there is an essential uniqueness reflected in a discernable style.

It is the burden of this section to elaborate the role of personality and perceptual factors within this unity of motor style.

Discussion of the role of personality will be brief and will be largely based on Eysenck's work. Discussion of perceptual characteristics will be based on cognitive style (field-dependence dimension) and on the concept of open/closed skills. Collectively, they provide further focus on the non-physical factors in motor performance and the possible role they exert.

(*a*) *Personality Characteristics.*—Excellent surveys of the literature concerning personality and motor performance have been made by Cratty, Singer, Welford and Kane and no attempt is made to duplicate their review

efforts. The work of Duffy and Eysenck form the basis of this discussion and they both tend to focus upon personality and performance in terms of an activation-theory of motivation. Eysenck in particular, in his two recent books,[10, 10b] has detailed in professional manner the field here so briefly discussed.

Duffy approached the question of storage and release of energy in terms of an activation theory defined "as the extent of release of potential energy, stored in the tissues of the organism, as this is shown in activity or response".[9, p 17] Her work is detailed, comprehensive and complex and has already generated research into motor performance within the laboratory setting. Three of her conclusions appear relevant to the position explored by this paper.[9, p. 194, p. 275, p. 322]

Eysenck is quite rightly regarded as one of the leading personality theorists and researchers of our time. He has developed a bi-modal approach to personality in terms of two major and independent higher-order dimensions—neuroticism and extraversion. While generally sympathetic to Duffy's formulations of a single activation-responsiveness dimension he finds it "difficult to see how one and the same dimension of activation-responsiveness can underlie two orthogonal behavioural factors"[10, p. 229]—the neuroticism and extraversion dimensions. He identifies differences in behaviour related to the extraversion dimension with differential thresholds in the various parts of the ascending reticular activating system, and differences in behaviour related to the neuroticism dimension with differential thresholds of arousal in the visceral brain.[10, p. 230]

It is certainly not appropriate to pursue this discussion further at this point. Certain relevant points based on Eysenck's research and writing appears as follows:[10, p. 224, p. 41, p. 163, p. 157, p. 110, p. 183]

In a quite different context, Fleishman[13, p. 178] noted that in tracking studies using a comprehensive fifteen-battery test of motor ability, only 25% of variance in performance was accounted for. In discussing these results he concluded that "there is, of course, the question that some of the unaccounted for variance is 'motivational' or 'personality' variance".

In still another context in which impulsivity and body build were examined, Kagan[18, p. 128] noted that while personally favouring an interpretation based on the assumption of attitudes towards self as a function of body build, "it is not possible to rule out completely the possible influence of complex physiological factors that are antecedent to both body build and the behavioural variables".

The point to be made from this brief exploration is that it appears feasible to claim that the suggested activation-responsiveness dimension underlying individual performance and personality characteristics, supports the notion of organizational and directional properties of personality with respect to motor performance.

(*b*) *Perceptual Characteristics.*—Clifton[6, p. 22] has drawn attention to the fact that physical education teaching and research has centred largely on overt performance rather than upon the underlying organiza-

tional processes which eventually serve to determine the performance we judge. She is echoing a general criticism of Western research effort as a comment of similar nature was made by Pietrasinski[22, p. 14] when comparing Western and Soviet research approaches to ability. The Western psychologists appear to be largely concerned with selection, measurement and classification of basic abilities, whereas Soviet psychologists are mostly concerned with the organization and evolution of abilities.

Clifton's comment is well taken as perceptual/stylistic factors which are idiosyncratic in nature may well impose restrictions as to the type, level and range of an individual's motor activity. Many researchers argue that perception is related to personality in an interactive fashion and that perceptual test performance reflects an individual's personality. This remains a contentious issue and Gibson[15, p. 130] appears sceptical of the "new look" perceptionists who subscribe to the argument that everyday perception of people must be coloured by their attitudes and motives, and their perceptions must reflect their personalities.

Cognitive style theories are part of the new look perception criticized by Gibson. However, the very thrust of their argument and research certainly appears to be related to the motor style concept as the consensus of work into perceptual/stylistic response suggests that the perception of the event is characterized by the person and not by the situation to be perceived. It is this organizational property of the individual which has become known as cognitive style; a particular information processing method which individuals seem to favour and utilize in their contact with their environment.

Research into the proposal that individual styles of processing information may be pervasive and stable determinants of behaviour suggests a pattern of self-consistency in processing. A consistency identified as cognitive style is that developed by Witkin and his associates. Witkin, in a continuing study of psychological differentiation, has proposed a field-dependence dimension as the perceptual component of a more general cognitive style.[28, p. 58] Briefly, the field-dependence dimension is related to the structural aspects of a person's psychological make-up and reflects the degree to which a person has analysed or structured his own experiences.[28, p. 13] The terms "global" and "analytic field approach" are derived from this theory.[28, p. 80]

On a practical basis, this analytic quality, reflecting a type of cognitive style whereby information received is processed, may be of considerable advantage in many sports where quick decisions are required; an advantage which may explain level of skill and even selection of the sport to be followed.

Witkin distinguished between an embedded field and a distracting field.[28, p. 49] The ability to overcome the effects of both an embedded and a distracting field appear to be closely linked with such sports as basketball, fencing, tennis, squash, hockey, football and sailing, etc. It is suggested that this dimension of field-dependence could well be an important factor determining selection of a sport, performance and even performance limits; it may be one basis for explaining why certain people excel at team games involving complex manœuvres or tactical play.

Before leaving this concept it should be pointed out that although acknowledging the importance of activity and constitutional factors in the differentiation process, Witkin stated that there were no conceptual grounds for expecting a relation between activity, in the motoric sense, and a field approach.[28. p. 187] However, little research has been carried out in motoric activity, or level of performance.

Torres utilized Witkin's embedded figures test to determine the relationship between figure-ground perception and the ability to make spatial adjustments necessary for effective catching. Her study reported some measure of limited support for the relationship examined. Her questioning[25. p. 49] of the suitability of a simple two-dimensional geometric task to assess perception of a three-dimensional on-coming object is well taken. Herkowitz, in similar vein to Torres, points out that most human decisions, particularly those regarding motor performance, are made within dynamic rather than static contexts.[15a. p. 91]

The second issue to be discussed is the open-closed skill continuum which was developed by Poulton in training skill research and elaborated by Knapp in classifying games skills as predominantly perceptual or habitual.

Utilizing Poulton's[23. pp. 468-70] classification of effector, receptor and perceptual anticipation, varying conditions of the perceptual field can be established closely paralleling a field-dependence-independence situation. According to Poulton[23. pp.472-3] a closed skill can be considered without reference to the environment or changing conditions; it can be made to fit the environment, provided the requirements are not too exacting and can be predicted in advance. An open skill is one which has to fit either an unpredictable series of environmental requirements, or a very exacting series, whether predictable or unpredictable, provided (*a*) that the unpredictable series of requirements is not too exacting, (*b*) that each requirement is presented either before the subject is ready for it, or before it is needed to be considered, and (*c*) that the requirements are not separated by spells of inactivity, a smooth complex movement can still be made to fit the series after practice.

From these conditions the concept of field-dependence can be readily tailored to fit the closed-open skill continuum; the closed skill favouring the field-dependent end, the open skill demanding more analytic and field-independent behaviour. It would appear that both open and closed skills would favour field-independent more than field-dependent people. In terms of motor performance, closed skill can readily be applied to such activities as gymnastics, swimming, track and field where the environment is stable and the action predictable. The open skill can be applied to game situations such as basketball, football, soccer, tennis, squash and hockey where unpredictable situations occur. Success in these activities depends upon both skilled technique and the ability to apply technique effectively and precisely. The ability to quickly assess the trend of play, or the predicted trajectory of a ball in flight, or to see a gap in the defence of the opposing team, may quite feasibly be related to the field-dependence dimension.

Knapp[19] has suggested that habitual skills (closed skill) are those in which performance is largely determined by ability to reproduce carefully and exactly a sequence of movements. Perceptual skills (open skill) are those which demand consistent appraisal of the changing environment and call for quick adjustment of the performer's part if the movement is to be effectively executed. Obviously there will be degrees of success in adapting or accommodating performance to the demands of the skill situation where emphasis is placed upon a changing environment or an environment which although predictable, is extremely complex and intricate.

The open-closed continuum and the habitual-perceptual skill classification are not to be taken as clearly defined categories with hard boundaries. An open skill for a beginner may have the characteristics of a closed skill to an experienced and competent player. Conversely, many people will be able to perform closed-habitual skill activities easily and with considerable expertise yet may have great difficulty in mastering skills in the open or perceptual dimension.

These formulations suggest that perceptual motor skill should be viewed as a continuum, position on which will vary with task, practice details and individual differences. Jordan[17, p.2] makes the observation that performance on the open-closed skill continuum relates to response selection and involves a decision as to which established pattern to select. The pattern selected may well be, or develop into, a mode of preferred activity which in turn would assist to define the motor style of the person.

Together, the cognitive style concept and the open-closed skill continuum tend to provide support for the notion that a perceptual basis may be operating in the choice of motor activity.

As a final point on the organizational role of perception it is of interest to note the work of Fantz and Nevis. They examined visual preferences in early infancy and reported a priority "in time and importance, of perception over action in early psychological development".[11, p. 389] This is clearly in opposition to the usual trend of theory which "postulates that sensory-motor co-ordination is prior to and crucial for subsequent perceptual or cognitive development".[11 p. 389] Fantz and Nevis[11 p. 393] concluded that perception precedes and outweighs action as an influence on the development of young infants. One wonders if this in fact continues throughout life and may explain or argue for preference for motor activity in perceptual terms?

To this point personality and perceptual factors in motor performance have been defined in terms of their role in cognitive style and open/closed skill continuums. It is now intended to examine the place of these factors within a model of school learning to further establish that the elements examined in the research study reported do in fact have relevance within the school situation.

2. Model of School Learning

The model of school learning adopted is that described by John Carroll;[3] it involves five elements: aptitude, ability to understand instruc-

tion, perseverance, opportunity and quality of instruction. The model does not account for attitudinal and emotional learning, but rather applies to those situations defined as learning tasks. Of particular interest to the present paper is Carroll's aptitude element and his emphasis on the time needed or actually spent in the course of learning a task. Obviously, aptitude is relative to a particular defined task and is the function of a number of variables. In discussing these variables Carroll noted that "aptitude may also depend upon a series of traits or characteristics of the learner which enter into a wide variety of tasks".[3, p. 726]

For the teacher the implication is clear. Individual characteristics may well be factors that will determine the amount of time needed for any activity or learning task. They will also influence the choice of instructional method, and the individual's ability to understand instruction.

This brief discussion of Carroll's model has established the position that individual characteristics (these are presumed to include personality and perceptual factors) do influence the aptitude variable of the school learning model and hence do have application from the research study to the general school situation.

The next task is to apply the idea of aptitude and personality-perceptual factors within the context of physical education. Skilled performance, reflecting both aptitude and the core of physical education purpose, appears to be an appropriate concept to select, define and examine in terms of research purpose.

3. Skilled Performance

Prior to discussing skilled performance, a word on the classification and definition of motor performance is called for. Motor performance is taken to refer to a particular definable and observable activity which reflects both organization and direction in its execution. In a narrow sense it is sometimes referred to as motor skill consisting of a number of basic techniques or movements which are combined to achieve a defined goal. In a wider sense it is often referred to as a motor pattern where a number of motor skills are involved. Distinctions between fine and gross-motor performance are traditionally made as reflecting manipulative as opposed to whole body activity; the latter is the concern of the present paper. Finally, the term motor ability is used in this paper synonymously with motor style to refer to an ability of general nature which determines performance limits on a variety of motor tasks.

There is general agreement that skilled performance has identifiable components. Fitts[12, p. 177] has suggested that skilled performance exhibits spatial-temporal patterning, continuous interaction of response processes with input and feedback processes, and learning. The feedback notion is emphasized by Welford.[29, p. 137] He further commented that all skilled performance is mental in the sense that perception, decision, knowledge and judgement are required.[29, p. 21]

To Bartlett,[2, p. 88] skill, whether bodily or mental, had the character of being in touch with demands which came from the outside world. He further suggested that skill was distinguished by the factors of timing,

halts, points of no return and direction. Of these factors "halts" were suggested as basic to an understanding of skilled performance; "halts" regulate timing which characterize smooth and efficient skill performance.[2, p. 17]

Applied to skilled motor performance it would appear that "halts" in timing may well reflect the effectiveness of utilization of the available environmental information, both internal and external, by the individual. Applying Bartlett's discussion to physical education, skilled performance would need to "fit" easily within the context of the external environment, to use available and stored information efficiently and to be sensitive to the demands of the environment. Conversely, unskilled performance appears stilted and awkward, tending to neglect or overlook the environmental detail which can provide direction to movement.

It is the general contention of this paper that the differential interpretation of the environment by the individual may well explain differences in overt performance, as such interpretation may well be related to personality and perceptual factors. It would be wrong if in emphasis on the non-physical elements of motor performance the role of physical factors appears to be ignored or minimized. Skilled performance reflects the interaction of physical, psychological and sociological factors but it is with the psychological factors of this interaction that the present paper is concerned.

The discussion in this section has presented Carroll's model of school learning as a basis for the present research. From this model aptitude and its individual supporting characteristics were examined and skilled performance was proposed as a central role of physical education teaching. Skilled performance was in turn analysed and the suggestion was made that organization and interpretation of the environment (both internal and external) were essential features of skilled performance. Further, it was suggested that individual differences in the utilization of the input factors may well be related to skilled or unskilled performance.

PART B: RESEARCH REPORT

1. The Study and Results

Method

Subjects.—Eighty-four third-form boys from a Sydney Metropolitan high school were used as subjects.

Test Battery.—The test battery administered included the AAHPER Youth Fitness Test, the 16 PF Questionnaire (Form C), the Maudsley Personality Inventory, and four tests selected from French's Tests for Cognitive Factors (Cf-2, Cs-1, P-3, S-1).

Administration.—The motor performance tests were administered during the first school term, 1969. The personality and perceptual tests were administered separately and in the third school term, 1969.

Results

The data of the study was analysed by product moment correlation technique using the null hypothesis and the University of New South

Wales, Applied Psychology Library programme PSY001. Significance of the correlations obtained was determined following procedure detailed by Guilford. For df = 83 a correlation of 0·213 and 0·278 was necessary for significance at the 0·05 and 0·01 levels respectively.

The pattern of significant correlations is set out in Table I below.

TABLE I

Significant Correlations: Personality and Motor Performance Variables

		Shuttle Run	50 Yards Dash	Softball Throw	600 Yards Run/Walk
MPI	E	−0·240*	—	0·329†	—
16PF	C	—	−0·247*	0·232*	—
	G	0·240*	0·264*	—	0·324†
	I	—	—	−0·299†	—
	M	—	0·239*	—	—
	Q3	—	—	—	−0·215*
	Q4	—	—	−0·326†	—

* Significant at 0·05 level.
† Significant at 0·01 level.
df. = 83.

Sixteen Personality Factors Questionnaire.—The significant correlations established were restricted to four motor performance items and six of the personality factors. For ease of interpretation these significant correlations are consolidated below.

Factor C:	50 yards dash	−0·247
	Softball throw	0·232
Factor G:	Shuttle run	0·240
	50 yards dash	0·264
	600 yards	0·324
Factor I:	Softball throw	−0·299
Factor M:	50 yards dash	0·239
Factor Q3:	600 yards	−0·215
Factor Q4:	Softball throw	−0·326

The negative correlations all reflect positive performance characteristics.

The trend of the correlations is presented in terms of personality then in terms of motor performance event.

Factor C.—Those boys described as mature, stable, calm and with high ego strength tended to perform well on the 50 yards dash and softball throw.

Factor G.—Those boys described as rather casual, unsteady and of low superego strength tended to perform well on the shuttle run, 50 yards dash and the 600 yards run/walk.

Factor I.—Those boys described as practical, realistic, responsible but "uncultured" tended to perform well on the softball throw.

Factor M.—Those boys described as unconcerned, egocentric and imaginative tended to perform well on the 50 yards dash.

Factor Q3.—Those boys described as high in self sentiment control, controlled and exact in their behaviour tended to perform well on the shuttle run and the 600 yards run/walk.

Factor Q4.—Those boys described as composed, calm and relaxed tended to perform well on the softball throw.

From a motor performance point of view better performance could be described as follows.

Shuttle run.—Those boys who performed well on the shuttle run tended to be described as casual, extraverted with low superego strength.

50 yards dash.—Those boys who performed well on the 50 yards dash tended to be described as emotionally mature, casual, unconcerned, egocentric and with low superego strength.

Softball throw.—Those boys who performed well on the softball throw tended to be described as extraverted, emotionally mature, practical, responsible but "uncultured", composed and self-satisfied.

600 yards run/walk.—Those boys who performed well on the 600 yards run/walk tended to be described as casual with low superego strength, yet high in self-sentiment control.

Maudsley personality inventory.—Two significant correlations were determined with the E scale scores—shuttle run and softball throw. No significant correlations were found with the N scale scores.

The significant correlations suggest that the person who scores high on the E scale likewise tended to perform well on the shuttle run and softball throw tests, relative to the sample group.

In Eysenck's terms, the boys who tend towards the high score end of the extraversion scale would likewise be expected to exhibit the traits of sociability, impulsiveness, activity, liveliness and excitability.[10, p. 37] In this study, boys who tended to exhibit these personality traits (reflected in E scale performance) also tended to perform well on the shuttle run and softball throw.

Attempting to bring the results together, it would appear that, within the limits of the study, boys who exhibit extraverted, self-assured and integrated behaviour likewise tend to exhibit superior gross motor performance on activities which have some dynamic or whole body movement reference.

Discussion

The study has provided some evidence of a relationship between personality and motor performance; it did not provide similar support for the suggested perceptual factor relationship.

In terms of the relationships between the 16 PF scores and motor performance, the picture of a stable, integrated and self-assured personality linked with high levels of motor performance, confirm the general trend of available literature. With reference to the established relationship between extraversion and two of the motor performance items, it can be

suggested that in Eysenck's terms,[10, p 24] superior gross motor performance may be related to high levels of inhibition in the reticular formation arousal system.

The perceptual tests did not provide support for the general theory developed. However, their "paper and pencil" nature may account for this fact. It is interesting to note Eysenck's[10. p.117] claim that Witkin's field-dependence dimension appears to closely resemble the N-E dimension. He tends to relate introversion to field-independence and extraversion to field-dependence. It will be remembered that in my earlier discussion I suggested that the field-independent person, with greater self-articulation, integration and awareness, could well be expected to perform better than the field-dependent person on both closed and open skills: but particularly on the open skills, Eysenck appears to suggest a different pattern of relationship. Perhaps further research may clarify this question as the direction of this paper's findings, relating extraversion-motor performance, suggest that extraversion and field-independence could be related.

TABLE II

Intercorrelation between Physical Variables : AAHPER Tests

1	2	3	4	5	6	7	8	9	10
1	0·110	0·163	0·278†	0·178	−0·109	0·136	−0·259*	0·381†	−0·194
2	—	0·594†	−0·078	−0·157	0·196	0·123	0·034	0·209	0·111
3	—	—	0·167	0·003	0·019	0·234*	−0·150	0·293†	−0·183
4	—	—	—	0·319†	−0·503†	0·480†	−0·673†	0·435†	−0·459†
5	—	—	—	—	−0·285†	0·195	−0·249*	0·213*	−0·171
6	—	—	—	—	—	−0·390†	0·517†	−0·284†	0·392†
7	—	—	—	—	—	—	−0·486†	0·301†	−0·214*
8	—	—	—	—	—	—	—	−0·466†	0·430†
9	—	—	—	—	—	—	—	—	−0·420†

* Significant at 0·05 level.
† Significant at 0·01 level.

	M.	S.D.
1. Age	174·13	5·89
2. Weight	118·98	20·67
3. Height	65·15	2·92
4. Pull-ups	4·57	3·31
5. Sit-ups	65·10	21·47
6. Shuttle run	10·46	0·68
7. Standing broad jump	78·01	10·77
8. 50 yards dash	7·52	0·81
9. Softball throw	134·51	33·76
10. 600 yards run/walk	129·32	23·04

One further issue will be mentioned before the implications of the study to teaching are made. This concerns the idea of a general motor ability factor which the concept of a motor style clearly implies. The intercorrelations between the six test items of the AAHPER test are set out in Table II. They provide some support for the idea of a general motor ability although the individual correlations themselves are not predictive.

The general-specific motor ability issue at times appears to replicate the classical "g" and "s" controversy of mental testing. Although investigators such as Lawther, Lockhart and Cratty appear sympathetic to a general motor ability notion, the bulk of research evidence (largely laboratory based) favours the idea of task specificity. At times the question appears to be one of emphasis and of a test battery selection nature.

Cattell's idea of a fluid-crystallized general intelligence factor may have some point in connection with this issue. Cattell[5a, p. 16] considers intelligence and school performance to be determined by personality and motivational factors as well as by two distinct, co-operative second order general factors—fluid and crystallized ability. Fluid ability reveals itself in tests requiring adaptation to new situations and appears to be biologically determined. Crystallized ability seems to reflect cultural habits in a range of ability measures[5a, p. 3] and is a function of fluid ability and personality factors. On the other hand, fluid ability is relatively free of association with personality factors affecting achievement.[5a, p. 17]

From this formulation it appears that performance on a variety of tests may in fact be determined by the particular type of ability tapped by the test and the involvement or non-involvement of personality factors. The question is complex and the extension of Cattell's ideas to the motor realm may well be invalid. However, in the context of motor style I can see personality as a mediating structure, a position which in some measure is congruent with Cattell's formulation. More to the point of the present discussion, it is suggested that personality used as a moderator variable may well provide important insights into the structure of motor performance. Indeed, the results of the study would tend to suggest that a number of hypotheses can be generated from the motor style concept with some degree of theoretical rationale to support them. It is fairly obvious that Lockhart's[21, p. 4] suggestion is close to the truth—that neither a theory of complete generality or one of specificity is adequate to explain how motor tasks are mastered—but the relative involvement of the general and specific factors still require clearer specification.

In concluding this section it is obvious that research evidence has been obtained to support a personality-motor performance relationship but the direction of the relationship remains unanswered. However, insofar as the theory surrounding the idea of personality within a motor style context can be considered viable, then the need to continue investigation into the relationships of this paper are of fundamental importance to any new endeavour in physical education.

2. Implications to Teaching

The implications for programme development and teaching are made in both specific and general terms; the specific relate to teaching, the general to programme development.

The specific implications posed are those which many teachers already apply under the name of intuition, sensitivity and common sense. Therefore, I apologize if the specifics discussed appear to be simply re-iterating the already "knowns"; however, one purpose of research is to provide objective evidence to support or modify these subjective "knowns" of educational practice. Hopefully, the points listed below may contribute to this end, always bearing in mind the restrictions which sample and test battery impose on their elaboration.

1. Personality pattern may assist in explaining a child's dislike and, at times, ineptitude for certain motor activities and, conversely, his liking

for others. Children may require patient encouragement and instruction in order to secure participation in activities within their physical capacity but not within their repertoire of preferred modes of motor expression.

2. In programme development it may be important to consider personality predisposition in assessing present performance and in selecting the type of activity best suited to the child's overall physical development.

3. The final point suggests that personality factors may have organizing and directional properties which act as mediating structures in determining preferred modes of motor expression and performance.

There appears to be good reason to include selected personality tests within the traditional cognitive assessment pattern. The psychological make-up of children who reveal narrow modes of motor expression and relatively poor performance may be of vital concern in programme development. The implications of this suggestion are clear: more trained school counsellors to provide basic information about children for a profession so clearly identified with affective and interpersonal responsibility.

The broader implications are couched in terms of individual differences and differential learning patterns. I am afraid that too frequently we accept without question the idea that children tend to interpret their environment similarly, that they respond to stimulus events in like manner, that everyone requires exactly the same number of exposure hours and that all the class should receive the some content loading.

Physical educators, above all teachers, have the opportunity to escape from what Hutchinson called "2 × 4" situation—2 covers and 4 walls—and to meet the child in a relatively unrestricted and unstructured environment; an opportunity to be utilized to the full by providing a flexible programme and a variety of class sizes. Under such a revision remedial programmes could well incorporate orthopædic and perceptual-motor responsibility.

Reading problems and their perceptual-motor basis is one area which physical education in the primary and secondary schools has, until recently, largely ignored. The writings of Piaget, Bruner and Hunt, together with the practical programmes of perceptual-motor activities initiated by Kephart, Frostig and Ayres, suggest that the introduction of physical education within the elementary school, based on a perceptual-motor approach, is of top priority and its extension to the secondary school, in a learning/reading disability context, is long overdue. Indeed, the lack of perception by physical educators that many learning problems on the "academic side" of school may be ameliorated through their programmes has frequently restricted their impact upon the total educational purpose of the school.

For many children in the secondary, as well as the primary school, carefully developed programmes of perceptual-motor activity may be the most beneficial motor experience to be offered. Such programmes reflect a motor style approach and are cognisant of motor-personality relationships and seek to extend the motor range and modes of expression of the physically awkward and tentative child. From this basis a wider and more realistic participation may be developed.

At this point it should be re-stated that the results of the study do not support a perceptual-motor performance link. Reasons for this have been suggested. My present discussion is based on published research and a firm belief that perceptual-motor training may be fundamental in establishing a broad basis for motor style development. Another paper to be presented to this session of the Congress provides more objective and practical support for my contention.

Obviously, it is rather easy to draw broad strokes of programme development which seem to obscure and ignore the realities of the school situation. Clearly, the notion of differential programmes runs straight into the hard realities of the school—training, shortage of staff, lack of facilities, and frequently a lack of administrative insight as to the educational potential of physical education. However, in concluding this paper, and in the spirit of this Congress, one must stress that without new horizons, no matter how difficult to attain, there can be no new endeavours and without new endeavours there can be little educational advance.

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Dr. Gunsoo Hoh, Superintendent of Physical Education, Republic of China, and Dr. Klaas Rysdorp, The Netherlands, ICHPER President, study the Congress programme between sessions.

The Role of Gross Motor Skills in Predicting and Averting Reading Failure

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In his recent article,[41] Paul Lengrand, chief of the continuing Education Section of UNESCO's Department for the Advancement of Education, said ". . . it is evident that educational theory has only a very tenuous link with educational practice." We must begin to strengthen this "tenuous link". There is much diversity of opinion on the teaching of reading. It does appear that most failure to learn rests in the learning process itself; rather diminishing the necessity for seeking elaborate psychological causes.[16]

Rationale

1. It is a matter of great concern that there are many children who reach the age of eight-plus years, not having acquired the basic skills employed in reading.

2. Basic inherent differences in the acquisition of reading skill have not been fully considered: such as the insistence of using a phonic programme for a child who is auditorily impaired, or a look-say method for a child who has visual perceptual impairments.

3. It seems only logical to try to prevent reading failure before the age of eight-plus years, because of the difficulties encountered later in remediation, possible emotional disturbance and, of course, the educational wastage.

4. The children in our Infants' Departments are within the age range of five to seven years, within the stage of maximum perceptual development.[20] Testing of perceptual abilities should be carried out as early as possible and a developmental programme provided, therefore. This approach is supported by the findings of Piaget and Werner concerning the evolving stages of sensorimotor, perceptual and linguistic functioning.

5. Gross motor skills may be employed wisely in perceptual development.

6. We could find no valid research to test the well-known theories supporting the use of gross motor activities in developing reading skills. Therefore, I decided to test the ones I found most feasible in a teaching situation.

1. Background

Our country has been the recipient of the printed argument from many authors and publishers through books and journals, on the possible valuable role of gross motor skills in learning, particularly reading.

Two major observations impressed me: many of the readings smacked of valid educational theory and, secondly, it was obvious that success was being achieved in special education. If the latter were true, why would these skills not help the special problems of children in a regular school.

Much of the reading on gross motor skills (sensory motor training) was in the context of perceptual training of the main sensory modalities—even though some used skeletal movement only or first, as a basis for developing other perceptual skills.

2. The Problem

As our work as a school is to teach all the subjects in the curriculum with reading as our biggest task at the age-level of our children, the challenge seemed to be to set up a perceptual training scheme to be integrated into all phases of the teachers' programme and yet have its own place in planning and emphasis. This scheme should include the four main sensory modalities employed in reading—kinæsthetic, visual auditory and tactile.

If these areas of perception were to be trained as such, we should determine the children's individual abilities in them through testing. Here we may be able to predict reading skill by expanding the test to include language development.

Thus we needed to gather a series of tests which would be given to the child as soon as he entered school (in this State (N.S.W.) at a minimum age of 4·75 years, but averaging 5 years of age in our case).

3. Compilation of a Test

In compiling the test battery, credence was given to the findings of Kephart,[29] Frostig,[20] Gesell[23] and de Hirsch.[27] As perception testing is reported to be a better indicator of reading achievement than I.Q. testing at this age, perception and language tests were chosen. Care was taken to ensure that tests selected were those which, under supervision. could be administered by the class teacher within a classroom situation, and given with standardized directions. Scoring points needed to be simple and yet adequate to provide sufficiently detailed profiles for programme planning. Our research is peculiar in that it has this practical nature.

It was decided to test the kindergarten children at the beginning of the year and to provide training for them in areas where their score was low, as well as providing developmental training in all areas of perception (and language) related to reading. The developmental training was important because these children are at the age of maximum perceptual growth.

4. The School Entry Screening Test

Item 1: Kraus-Weber tests (1-6).
Item 2: "A-J" test from Winter Haven scheme, consisting of 10 items.
Item 3: Dominance testing. Eye, foot and hand dominance are tested.
Item 4: The perceptual forms test. Gessell's test, as used by Winter Haven[17] is given.
Item 5: Human figure drawing. Goodenough: draw-a-man test.
Item 6: Auditory. Perceptual patterning and language testing according to de Hirsch in "Predicting Reading Failure".
Item 7: Tactile, haptics, haptic-visual and haptic-kinæsthetic equivalence. Tested according to Di Meo's description of terms.[32]
Item 8: Colour blindness test.

5. Administration of the Survey Screening Test

The test is given between the third and seventh week after beginning school, since a period for orientation into the school environment is allowed first. The teacher administers each part of the test at one time, taking the children individually in the classroom. Groups of children who have difficulty in any item are listed and a programme of exercises is drawn up in order to give them special training.

A social adjustment scale is checked by the teacher at the end of the first term (after three months at school). This scale has produced interesting correlations with ability ratings in the perceptual skills.

6. Follow-up Testing

At the end of the first year at school the Frostig test of visual perception, the Scott Foresman inventory survey test, the Bender visual-motor Gestalt test, the Peabody picture vocabulary test and, where appropriate, a reading age test is given. These tests enable us to design programmes for the children in the following year. Through the period in the Infants' Department, testing is given at the completion of each section of the programme in reading—sections cover an average of three months, according to ability ratings.

Kephart and Chaney[12] observation checklists are kept on each child with dated entries for performance on each skill. This testing is done within the teaching situation. Individual check lists are kept daily on visual perception exercises.

As the programme progresses, individual check lists are kept on walking board, jumping board, balance board and "space walk" activities.[4]

7. General Developmental Perception Training

It is significant to describe briefly, in order to see the use of gross motor skills in perspective, the nature of the general programme and to refer to other areas of perception training integrated. Most training in kinæsthetic perception is given through the use of exercises suggested by Kephart and Chaney; in Visual Perception by Marianne Frostig,[21] Continental Press and Milliken Stencil matters. These are supplemented by the teachers' stencils where children need to repeat exercises. Auditory and language training are closely integrated and are developed into a psycholinguistic programme based on ITPA, and exercises from many books for infant teachers presenting language development and auditory skills. Tactile, haptics: haptic-visual and haptic-kinæsthetic (Di Meo[31]) abilities are trained by exercises similar to those described in the test.

It is important to state that this developmental work is not merely being carried out for purposes of experimental evidence but that it is integrated into a curriculum of work which covers all subjects to be taught at school, so that individual problems can be identified and remediated within the context of the daily schedule.

8. Developmental Training in Gross Motor Skills

Results from the survey screening test are used to suggest to the teacher points of emphasis in the perceptual training programme for the whole class and for groups of children who encounter special difficulty. The developmental programme includes Kephart's points from "Motoric Aids to Perceptual Training"[12] (and its check list), gross motor training as suggested by Frostig,[20] Cratty,[14] the Winter Haven programme and Belgau[4] particularly. This training is integrated into the physical education programme. The time allocation in the developmental programme is three hours per week, but additional time is allowed for some children who indicate a greater need in this area. Eighty-four exercises are checked on the walking board, 27 on the jumping board, 18 on the balance board.

Performance is improved by practice, teacher encouragement, motivation and maturation; the latter including physical, intellectual, perceptual growth. In motivating, the element of competition[30] was considered. At the age level of our children performance is found to be best improved by self-competition rather than with peers.

Clifton[13] quotes Hebb as giving attention the same meaning as perceptual set in gross movement. "Set prepares the 'individual to attend to' certain of many stimuli . . . when attention in cognitive situation has been conditioned to certain stimuli . . . these stimuli can be located in a search task more rapidly than before conditioning". The implications from these writings for us are that practice is a major factor in improving perception.

Another writing which had a practical application for us was that of Guildford.[26] Observations of our children supported his classification matrix theory of general and regional abilities as we helped them to improve their skills. We had a picture of "general factors" from the testing battery. These, I quote, "are more dependent on heredity and the

regional ones relatively more on experience".[26] The most efficient help in improving regional abilities was given by additional verbal instructions during practice. These abilities, of course, were the ones we had to concentrate on at school.

It was felt that the development of regional abilities was most important in promoting the growth of perceptual skills through gross motor training.

9. Observations Made in Training

In the motor activities we found (in agreement with Espenschade[19]) that children from lower socio-economic levels tended to be superior in motor activities. This we found in observing levels within one school and in comparing two schools—one in a higher socio-economic population and one in a lower. The children from the lower socio-economic level had superior skills in visual perception as indicated in performance on the Frostig programme.

It was interesting to note that the children from the higher socio-economic group had a higher performance in auditory and language skills. They also showed greatest benefit from training in visual-motor and other visual perceptual skills. It is believed that these observations of poorer performance in the gross motor skills of the children in the higher socio-economic level may be prejudiced by the fact that they were mostly flatdwellers with little or no playing area.

No correlation was found in general between the performance of motor skills and measured intelligence except, as many researchers have found, at the low end of the range. We did find that children of higher intelligence in test scores improved their performance more quickly, possibly because of the growth of cognitive skills which aided the interpretation of directions for improvement. Piaget, "the more numerous the sensory motor experiences, the more numerous the cognitive structures resulting in the greater number of tasks that can be resolved". Added to previous statements, this thought supports our theory of practice.

A discussion on feedback was studied for training procedures. Clifton[13] states that "feedback concurrent with predetermined movement establishes a loop effect and functions as new input, thus "continuing the perceptive process as long as it is required in a given movement situation". Feedback was not used as a control concept in our situation because we were not equipped to determine the extent to which the children were attuned to feedback information.

The matter of figure and ground was studied as well, and Gallahue's[22] and Cratty's[14] discussions were read. Gallahue[22] cited significant relationships between figure-ground variations of a gross motor task and the figure-ground subtest of the Frostig developmental test of visual perception. We interpreted these findings as supportive argument for including figure-ground training in gross motor skills to aid development of figure-ground perception. Programming in this area was made with a mind to Cratty's[14] statement that perception is influenced by "the manner in which we select central objects from their background and our relative depen-

dency upon the central figure . . . when making perceptual judgements". Teacher observation and perceptual testing generally supported these theories postulated. We found that children varied in their perception of figure and ground and exhibited anxiety when their task was inhibited by blending of the figure and the ground. We did find that children who had the ability in figure and ground exercises in the Frostig programme were not necessarily always adept at figure and ground ability when performing gross motor tasks. Conversely, gross motor tasks in figure and ground aided children who had difficulty on paper exercises. This was difficult for us to explain. Interesting experiments are being carried out in the area of figure and ground currently. Our observations above therefore support the view of "perception as an active, creative process, not a static reception of inputs".[37] Further, that "perception concerns a relationship—between physical energy from the environment specified in physical terms, and psychological experience, referred to in psychological terms".[37] We would add Bruner's[2] conclusion that "perception is strongly determined by past experience with the environment". We could observe this simply and apply it to our theory of practice. "The lack of figure/ground perceptual ability may cause a child to lose his visual orientation in space", according to Gallahue. This statement, coupled with the Gestaltists' view that figure-ground perception is "the first perceptual process" (and our own observations) supported continued gross motor exercises to develop figure/ground perceptual ability.

The value of practice had to be assessed by us continuously because time is so precious in a school today. Hebb[13] says "that a neural circuit starts operating as soon as any portion of it is excited. Initially the growth of cell assemblies and phase sequences is slow, and thinking and learning are tedious. With the organization of elaborate phase sequences conceptual and insightful learning becomes easier". Our interpretation of the comment validated for us the importance we place on practice and the possible integration between gross motor skills and academic skills.

10. Observations in Testing

A high correlation was found between performance in the gross motor skills and achievement on the Frostig visual perception programme. Only seven children (five of whom were boys) in 88 kindergarten children failed to show that correlation in 1969. These seven children were referred for professional testing, and differential diagnosis disclosed that two children were emotionally disturbed, two boys had minimal cerebral dysfunction, one was culturally deprived and two were emotionally deprived.

This year in testing the correlation did not exist for one boy from a non-English-speaking home, one boy who was diagnosed aphasic and one who had a chronic health problem (bronchitis). In the case of the first boy, we believed that there was a problem in interpreting directions given in English. Because this correlation appears to exist it was suggested to us that we should regard the correlation as significant and that we train the children in gross motor skills as an aid to developing perception.

11. Observations on Training

All children who indicated by their progress in the perceptual training scheme and testing that they had the ability to identify word symbols were introduced to reading. This meant that by the time the kindergarten children moved into first grade, minimum age five years nine months, average age for our school six years, that many had already attained a reading age on a standardized test.

The top reading age in this group was seven years. The children moving into first grade were divided into three classes and the whole of the grade had a reading age curve in the first term of 5·2 to 7 years. The average reading age of children commencing first grade was 6·4 years, 0·4 years in excess of their chronological age. The disparity between the chronological age and reading age widened greatly in the first six months in first grade. By mid-first grade the top reading age in first grade was 9·2 years and the most advanced class averaged 8·2 years—seven-tenths of one year in excess of their average chronological age. The reading ages throughout the first grade on the average were 1·4 years higher than those in corresponding classes in the same months in the preceding year when the scheme under discussion had not been introduced. There were no other significant variables. It appears that perceptual testing to provide individual programmes in perceptual training is a factor aiding this increase in average reading ages as all other factors in the environment and average scores in basic abilities remained the same.

We are inclined to think that the perceptual training scheme with its intensified practice programme allowed the children at this stage of marked perceptual development to achieve a somewhat higher reading age. It is possible, however, that organization of the children's work instituted by the implementation of such a scheme was more thorough and that general supervision of the children and their work was more efficient resulting in higher reading ages. Because we were concerned with administration of teaching programmes in a school it was only fair to give the training to all children. Comparisons, therefore, had to be made with reading scores in previous years to judge effectiveness of training in perceptual skills.

Our results differed from those reported by Arciszewski.[2] In his pilot study to evaluate the effects of the Frostig programme of visual perception on the visual perception and reading ability of first-grade children, it was found that "perception training may significantly improve the visual perception of the first-grade students", but "the reading scores of children receiving perception training were not significantly different from children receiving phonics training". Perhaps one reason for the difference is the lack of a screening test to discover strengths in the sensory modalities and to provide individually-styled programmes. We believe in a longer training period than the one reported by Arciszewski.[2]

At the end of the first year of training, results from the Frostig visual perception test indicated varying rates of improvement. This, amongst other observations, supported some of the popular theories of the moment on developmental lag.

We were interested to notice that the curve of improvement in performance had plateaux for some children and that children sometimes improved for a period of time at a greatly accelerated rate. It was found worthwhile to continue gross motor training throughout the course in the three years in the Infants' Department. Until second grade, all perceptual training is integrated in subject areas with special help for children who have problems. One of the reasons for this was that some children would improve in perceptual skills as applied in reading and later regress for a time. It was felt that regressions were helped by additional training in perception through gross motor skills. In addition, general physical and social development was aided by such training.

Where children had problems in perception of position in space (likely to cause reversals)[43] according to our observations, they were aided by additional practice in visual motor training. Of the 88 children in the first grade, 1970, who had received the training programme in kindergarten, only four showed any reversal problems by age six years. We were used to expecting between 20% and 30% (17 to 26 children out of 88), with reversal problems (see Vernon[42] on reversals).

12. Unexpected Outcomes from Testing and Training

To put it simply, perhaps best of these is the motivation on the part of the staff and the children. The staff commented on the fact that they could understand the nature of the children's learning more at kindergarten and first-grade levels than they had been able to before. They felt that in the past they had been working in the dark as it were, in trying to provide a successful programme which would include games and activities in various areas applied to reading. Now they had a programme and a profile of each child's performance at any given time. Teachers observed again and again that the children who had problems in discipline, who had evidenced shortened attention span in group situations, who had problems in social adjustment with their peers, were more settled and work performance was greater. It is significant to relate that by the end of the first term, i.e., three months' training, no child had a significant personality deficiency in so far as sociometric relationships in the classroom were concerned. The effect of success in the programme on self-image is very noteworthy. Self-image was maintained in children who showed improvement in the gross motor activities. This area more than any other specific area, helped in the development and control of self-image.

Motivation is now regarded to be a highly significant factor in performance in the perceptual training scheme. Children were motivated by the fact that they had detailed records of their own achievements even at kindergarten age level. It was not uncommon to have a child approach the teacher very excitedly to announce a good score in his training programme. Such anecdotals motivated the teachers and reinforced their interest in the programme.

Motivation was also assisted by self-improvement records because so many of the tasks were being undertaken at individual levels. The spirit of competition did not enter into the motivation as much as one would expect with older children who are not so egocentric.

Thoughts expressed in my rationale have been satisfied in that we believe that the children who are likely to fail in reading in the early stages had been discovered and, to some extent, their problems remedied.

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Physical Fitness Studies in Physical Education for Women

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In the field of physical education, it is of great importance to develop the physical fitness of the people. As an introduction of this presentation, the levels of women's fitness have been attempted to compare with those of men for a better understanding of women's physical characteristics.

In Table I shown were the percentages of Japanese women's fitness as compared with those of men. 100%. Comparing the absolute values measured, the women's body size (or mass) was much less than that of men, as observed typically in body weight (87%). Most of the functional items also showed considerable sexual differences: for instance, 67% in maximum oxygen intake (VO_2max) and vital capacity (V.C.). But no distinct differences were found in neural functions and flexibility. It may also be reasonable to compare the relative values to body size or weight, since the absolute values might reflect the body mass in the functional test results. However, the relative values computed still indicate less abilities in women than men: *e.g.*, about 80% of men in the items of VO_2max/weight and V.C./height. In this consideration, suspected is the influence of the amount of fat involved in body weight. In fact, women showed 2·7 times that of men in the skin-fold thickness, whose greater differences appear after the pubescent period. Regarding this point, a study by M. Ikai *et al.*, with an ultrasonic method, demonstrated no sexual difference in the strength per unit cross-sectional area of the muscle. Another proof may be referred to the fact that maximum oxygen intake per lean body mass (weight without fat) showed less difference than maximum oxygen intake/weight. General motor performances of women resulted in one of the lowest percentages, i.e., about 70% of men. This might be because general motor ability reflected not only the defects in various fundamental functions but also reflected a handicap of comparatively large body weight to be carried.

The primary purpose of this paper is to present the effects of training on the women who possess such physical characteristics as mentioned

above. Training here does not mean the ways of raising top athletes but for the development of physical fitness in ordinary women. The ultimate goal of the project was to study the training method that may be applicable in practical physical fitness in the school systems.

TABLE I

	Items	Women/ Men (%)
Body size	Height	93·5
	Weight	87·3
	Chest circumference	95·8
Strength	Back strength	56·3
	Grip strength	63·7
	Elbow flexor strength	60·6
	Back strength/weight	(64·5)
	Elbow flexor strength/cross-sectional area	(98·4)
Circulatory function	Heart size	80·5
	Heart weight	84·0
	Stroke volume	85·5
	Minute volume	89·4
	Stroke volume/body surface area	(93·9)
	Number of red blood corpuscles/mm.^{3}	(87·8)
	Hæmoglobin/100 ml	(87·4)
Respiratory function	Total lung volume	67·8
	Vital capacity	67·4
	Maximum oxygen intake	66·7
	Vital capacity/height	(80·0)
	Maximum oxygen intake/weight	(80·0)
Neural function	Simple reaction time	100·0
	Tapping	103·5
	Stepping	94·9
	Whole body reaction time	94·8
General motor ability	Sidestep test	92·3
	Flexibility	103·9
	Vertical jump	66·8
	50 metres dash	78·0
	Running long jump	70·5
	Handball throwing	63·7
Skin-fold thickness	Back (dorsum)	231·2
	Abdomen (abdomen)	245·3
	Upper arm (strachium facies anterior)	289·5
	Thigh (femur facies anterior)	321·2

1. Training of General Endurance

The major factor that supports general endurance is the amount of energy consumed in a given time unit under the steady state. The maximum oxygen intake is usually recognized as a primary index determining human aerobic capacity.

Among men, the maximum oxygen intake and endurance running time increases with age. In the case of women there is a decrease in the above two factors from 10 to 17 years of age.

Experimental Method

An experimental and a control group of girls aged 19-21 years were taken where the experimental group followed a training programme of five minutes of running three times per week.

The results showed:

1. An increase in the running distance over five minutes, significant at the 1% level.
2. 133·6% increase in endurance running time on the treadmill.
3. An increase in maximum oxygen intake.
4. An increase in the red corpuscles and the hæmoglobin level.

All of the above increases occurred in the experimental group. There were no significant changes in the test items for the control group. It is concluded that a five-minute training run three times per week is an effective and adequate training method for improvement of general endurance.

2. Training of Muscular Endurance

The study or training of muscular endurance was conducted by M. Ikai and A. Kagaya and was conducted to analyse the relationships between muscular endurance and blood flow to the acting muscles.

Experimental Method

A group of 13-year-old boys and girls were subjected to a training programme of grip contractions on a grip ergometer six times per week. The training load was one-third of the maximum grip strength of each individual and the series of rhythmic contractions were performed at the rate of one per second.

Experimental Result and Discussion

1. There was an increase in blood flow, greater in boys and girls than in adults, to the working muscles.

2. The number of muscular contractions increased significantly in all groups.

3. No sexual differences were found in the increase in ratios of the number of contractions and in blood flow at the end of six weeks of training. Training effect for men and women appears on a similar pattern.

3. Training for Strength

Among the sexual differences of physical fitness, the difference in muscular strength was the largest. In general, between men and women, the women's strength would be some 60% that of men.

In my current experimentation, adult women were subjected to perform dynamic strength training of the upper arm flexor muscles with various amounts of loads.

Experimental Method

Ten teams of female subjects, 18-20 years of age, were given various frequencies of training and various frequencies of weight loads.

Experimental Result and Discussion

1. Testing each of the individuals, initial strength as 100%, it was shown that the groups that performed six, four, three and two times per week had an increase of 140-150% after twelve weeks. The increase ratio of the group that performed once per week was 110%.

2. The group that trained with a two-thirds maximum load improved to 140-150% while the group that used half maximum load increased 110-120%.

3. In most subjects it was noted that the increase curve became plateau at the 20-22 Kg. level.

4. In conclusion, the muscular strength for women will reach to that of ordinary men after three months of training by two-thirds load of maximum strength with a frequency of more than twice per week.

Summary

In summarizing, the following statements would be made:

1. The absolute value of women's physical fitness, in general, is smaller than that of men, even after a consideration is given on the comparative value of height and weight which are smaller than men. However, when the effect of the amount of fat was excluded, no sexual differences were observed. The reason why women's motor performance does not increase after the pubescent period is considered to be ascribed to the accumulation of fat, which is of biological character among the post-pubescent girls.

2. The training on general endurance, muscular endurance and maximum strength would be quite effective, if the training method is appropriate, even in a comparatively shorter period of time. Thus it was concluded that by proper method it will be possible to develop potential physical fitness by increasing the amount of energy source.

3. The goal of the women's physical fitness may be different, in some points, from that of men. However, it is essential to know how to develop women's fitness in order to make the foundation of the healthy life. For this purpose more studies on the training method would be necessary by understanding the characteristics of women.

Skill Learning and Teaching: A Cybernetic Model

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CONCERN has often been expressed at the inadequacy of traditional psychological approaches to explain adequately human behaviour, in particular the complex behaviour that characterizes skilled performance.

> A student beginning psychology today must find it very difficult to realize fully the revolution that has taken place during the last decade. Thought has become clearer and more confident in many areas and substantial progress has been made towards a psychology which is truly quantitative and thus towards the removal of what had previously been one of the subject's most serious drawbacks. (Welford, 1960, p. 189.)

The approach to which Welford refers has been termed cybernetics. Cybernetics is the science of control and communication in the animal and the machine, and is concerned not with things, but with ways of behaving. Thus, cybernetics treats any particular systems by asking what are all the possible behaviours that it can produce? In particular, the cybernetic approach makes two important contributions to the study of biological systems (Ashby, 1956):

i. It offers a single vocabulary and set of concepts suitable for representing the most diverse type of systems.
ii. It offers a method for the scientific treatment of complex systems.

The behaviour of a cybernetic system has three basic characteristics: change, regulations and adaptation, see Figure I.

A *change* in the present state of the system upsets the equilibrium or balance and demands a restoration or elimination of the difference. Thus, a condition of thirst or hunger demands to be satisfied, an unsolved problem needs to be solved, and a new skill has to be mastered. Change is indicated by a discrepancy or difference existing between the present state of the system and some other preferred or desired state or level of operation. *Regulation* is the means by which such a difference is eliminated. The degree and type of regulation required is indicated by the feedback in the system. Feedback is said to exist when two elements of a system influence one another. When circularity of communication exists between

parts of a dynamic system, feedback is present. Such a system is called servo-mechanism, that is, a machine which is controlled by the consequences of its own behaviour, for example, a thermostatically controlled oven. Finally, the state to which the system changes or is modified indicates its level of *adaptation,* at which it has attained equilibrium or balance. Thus the thirsty animal drinks water until satiated, and the new skill is practised until a satisfactory level of performance is achieved. The degree of adaptation or the extent of the discrepancy in the system is indicated by the feed-back. The system modifies its behaviour until a state of equilibrium is reached. At each stage, learning is taking place in the human operator.

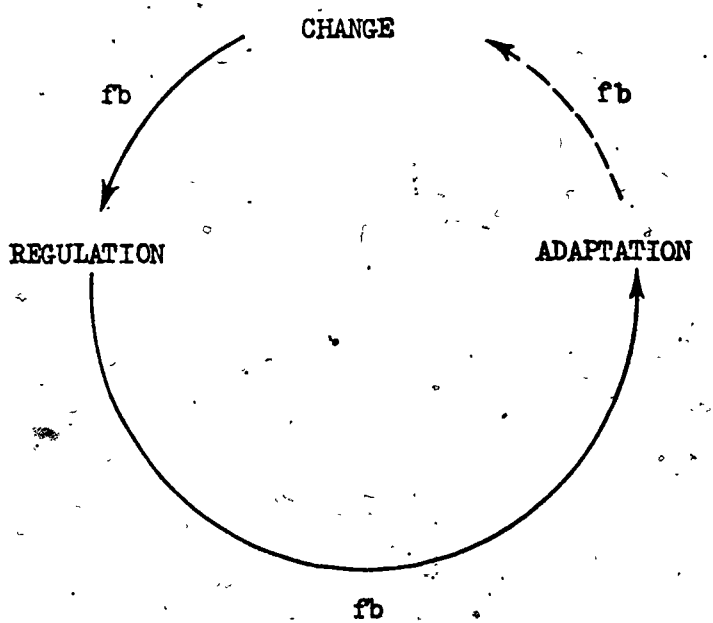

FIGURE I: The cybernetic model.

The study of cybernetics and skill have developed hand in hand, and in particular through the study of the human operator in man-machine systems, see for example Craik, 1947, 1948.

The relevance of the cybernetic approach to skill is further indicated by Oldfield's (1952) definition, ". . . skills involve behaviour which tends to eliminate the discrepancy between intention and performance" (p. 53).

The use of the term "skill", describes that behaviour in which perceptual, effector and feedback processes are serially organized both spatially and temporally, and are related to some particular outcome. Skill in this sense refers to a process whereby input information is related to past, present and often future predictable events. On the basis of this information the decision process initiates, and some effector mechanism

organizes, the most effective response. The discrepancy between the response and the desired outcome in the form of feedback information is the basis for modifying subsequent behaviour in this particular situation.

All skill involves the organization and integration of component processes, but to differing degrees of involvement or contribution. The final outcome, the response, is an expression of the linkage of these components. If skill can be regarded as such a process, then the many different skills and the different levels of skilled performance may be accounted for by the degree of involvement of such components and their effective organization.

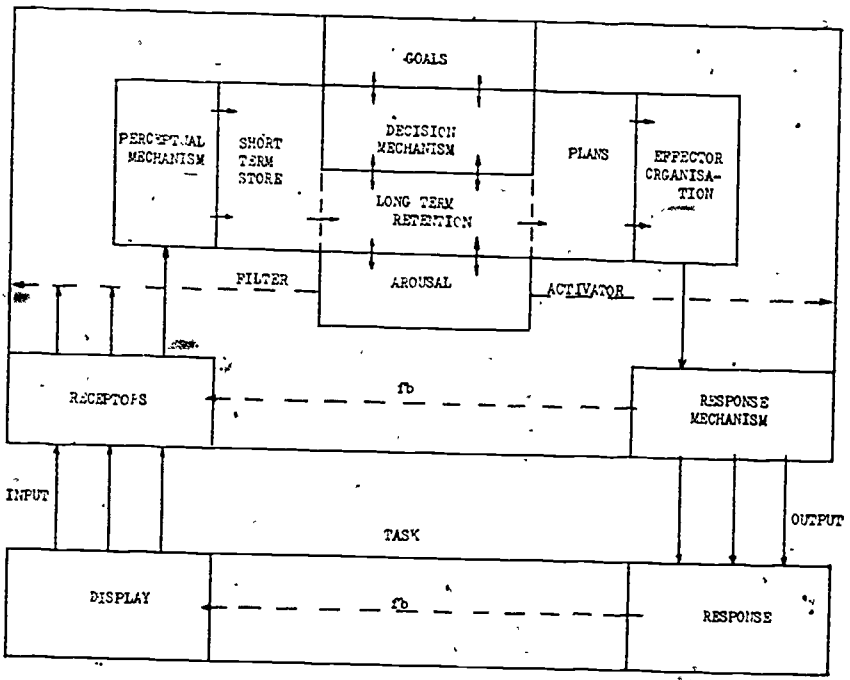

FIGURE II: Hypothetical flow diagram of some component processes involved in skill.

Crossman (1964) and Welford (1966) have provided hypothetical "flow diagrams" of some of the component processes involved in skill behaviour, see Figure 2. Such diagrams are based on the large amount of evidence now available and reviewed, for example, by Welford (1968).

Even though the flow-diagram is composed of a number of apparently separate processes, it should be realized that performance depends not only on the operation of each of these but on the relationships and integration between them. This system is never static or quiescent but is continually active, organizing, integrating and constructing; "Every bit of

evidence available indicates a dynamic, constantly active system, or, rather a composite of many interacting systems . . ." (Lashley, 1951, p. 135).

Skills, such as throwing, typing or playing chess, may be regarded as a particular combination of the component processes. Assumedly each skill involves different combinations and organizations of these components which participate at different levels of involvement.

The classification of skills as open or closed (Poulton, 1950) or as ballistic or strategic (Welford, 1962) describes which components are principally involved. An open or strategic skill, for example, playing chess, is characterized by stimulus and perceptual uncertainty and the uncertainty of outcome because of the number of possible solutions. This type of skill clearly involves perceptual and central decision making processes to a large extent. The effector involvement is minimal, for example, moving a chess man, and its degree of refinement has little or no influence on the outcome of the game. On the other hand, with closed or ballistic skills, the outcome is highly predictable and can be performed with little direct reference to the environment, as there is minimal stimulus uncertainty. Many athletic skills are of this nature, for example, sprinting, and the shot-put, and involve essentially effector and response organization processes. The criterion of success is usually dependent upon the effectiveness and degree of precision and accuracy of the response. Provins (1967) mentions a third classification, cognitive skills, to describe those tasks which stress the decision-making activities of the operator (e.g., problem solving in mathematics) in distinction to the perceptual and effector mechanisms which play a minimal role.

Welford (1969) summarizes this point of view regarding all skill as a compounding of processes:

> It has come to be recognized that there is no hard and fast line between sensory-motor skill and mental skills. Much of sensory-motor skill consists essentially of decisions which, in turn, require the recovery of information from memory, coordination of data in time and, more subtly, "strategies" implying prediction of the outcome of actions. All these are prominent in mental skills; the only major difference between the two types lies in the fact that mental skills typically do not involve the nicely graded motor action and fine perceptual discrimination commonly required in sensory-motor skills (p. 6).

Implicit in the use of the word "skill" is some quality of performance or behaviour. Common usage of the term implies some expertness or practised ability. In general, the traditional definitions of skill in the psychological literature extend this view; ". . . an integration of well-adjusted muscular performances" (Henshaw *et alii*, 1933, p. 2) and ". . . the learned ability to bring about predicted results with the maximum certainty often with the minimum outlay of time or energy or both". (Knapp, 1963, p. 163.) Skilled performance, as distinct from unskilled performance, implies that the component processes have been effectively organized to produce a response that is a close approximation to the

desired outcome. Such a response is said to be well coordinated or integrated, to be accurately timed and appears unhurried and effortless.

The cybernetic notion of skill regards human performance as the result of a felt discrepancy or difference between some plan and the present state of the system. The extent of the difference, the degree of misalignment or discrepancy, is monitored by the regulation system, in particular, feedback. The subsequent behaviour of the system is such that successive responses are made to eliminate the discrepancy between intent and action. When the goal or plan has been fulfilled, the system has adapted or attained equilibrium and the error feedback is absent or insignificant. In the case of skill, learning has taken place.

In terms of learning a skill, and hence, from a teaching point of view, the cybernetic approach, provides a number of very useful operative concepts. Two of these will be discussed:

i. Plans.
ii. Feedback.

i. A plan may be regarded as a hierarchical process in the organism that can control the order in which a sequence of operations is to be performed (Miller, Galanter and Pribram, 1960). The significance of the plan in the cybernetic model is that it indicates a state of disequilibrium or incongruity in the system, and when the relevant stimulus or perceptual information is present, moves the system to activity to reduce this discrepancy. The plan is a programme of "instructions" which directs the actions and responses of the operator to remove the discrepancy between intent and action. Thus an individual may have a plan to gain a degree at the university as well as plans for the forehand drive in tennis and the sequence of movements in playing a tune on the piano.

From a learning and teaching point of view, the way in which the learner constructs a plan is important. For example, individuals who have difficulty in forming an accurate plan of what is required (by some external criterion) will not be able to achieve the desired end result, no matter how much practice is given. Thus the athlete who cannot form an accurate plan of the western-roll technique will not be able to achieve a high level of performance. Highly skilled athletes have developed very precise and accurate plans. It is clear that the formation of plans should proceed at a rate suitable to the individual, with opportunity to explore, investigate and question so that the plan can be expressed in terms meaningful to himself—that is, coded and translated in his own terms.

The manner in which the plan is implemented and controlled depends on the time available to organize and monitor the movement. Where time permits, the movement is under direct sensory control and thus must take longer than 0·3 to 0·5 seconds to complete. Hick (1948) and Vince (1948) provide evidence that the least interval of intermittent functioning is about half a second. Such movement control is referred to a closed-loop behaviour. In skill behaviour the fact that voluntary movement is monitored and modified by sensory feedback has been demonstrated in a number of studies where delaying or distorting the sensory information has led to a breakdown in the serial organization of the skill (e.g., Lazlo, 1966, Provins,

1957, 1958). However, in high-speed skills such as the tennis serve or baseball swing, the complete stroke may be completed in less than half a second. Clearly such movements are beyond sensory control and once initiated, run their full course without further monitoring. This type of movement is under open-loop control. Although the intermittency sets a limit to the speed of decision making in the human operator, there is evidence that suggests the skilled performer develops an organizational strategy using the open-loop means of control to overcome this limitation. Larger units of action are formed and controlled in open-loop fashion (Bryan and Harter, 1899; Pew, 1966), thus the skilled typist and pianist may order and organize finger movements at the rate of 12 to 16 per second. Such a strategy has several advantages, for it leaves the decision-making mechanism relatively free for longer periods, and also ensures consistent, stable performance which reduces the feedback to be handled. The organization and grouping of larger units of action is achieved by the formation of a motor programme (Keele, 1968). The skilled performer uses an open-loop strategy and develops a number of motor programmes that permit consistent and stable performance (Glencross, 1970) and which place less demand on the central decision mechanism.

From a teaching point of view, the recognition of two types of movement control has important implications, particularly in terms of part v. whole learning, transfer of training, speed v. accuracy, the general time relations in practice and the timing of feedback.

ii. Both the formation of the plan and the process of regulation leading to adaptation, involves the use of the feedback in the system. Feedback may be regarded as any information available for regulatory and adaptation processes. It will exist in the form of proprioception (intrinsic feedback) and also as information from the exteroceptors (extrinsic feedback). Specifically feedback provides the learner with information as to what plans to form and how to form them. It provides details of how the plan may be implemented and then monitors how effective the response was by indicating the error, discrepancy or misalignment between the action and the intent. Finally, through feedback, information as to the appropriate adjustment or modification is provided. The central position occupied by the notion of feedback in the cybernetic model is emphasized by Annett (1969):

> The feedback concept is significant not simply because it suggests analogies between organisms and machines but because it suggests certain basic characteristics of the structure of behaviour. Rather than being simply run off as a result of prior stimulation, behaviour both simple and complex can be seen as governed by results at all levels (p. 36).

Feedback may be involved in setting a standard of performance as well as information necessary for corrective action. It may be in the form of knowledge of results, reinforcement, reward or punishment, teacher or coach comment, observation of one's own performance and the "feel" of the movement. All information, no matter what its source, may be used to ensure continued activity towards the reduction of the dis-

equilibrium, instability or non-conformity in the system and thus in reaching an acceptable level of adaptation and hence performance.

However, it is clear that the feedback must be in a form usable by the system. Thus in the case of skill learning, the learner must have feedback that is meaningful and that provides information as to what modifications to make and at what level in the system they need to be made. Welford (1966) says ". . . the information given should indicate the discrepancy between what is required and what has been achieved rather than merely give a reminder of what is required or some broad measure of achievement" (p. 15). In other words, both simple and complex behaviour may be seen to be governed by the results of the action at all levels.

In terms of change, regulation and adaptation, the cybernetic model makes meaningful the traditional problems and questions in skill learning and teaching. Instructions, demonstrations, visual aids and mental practice influence the formation and modification of plans. The distinction between open- and closed-loop means of control provide a basis for part v. whole learning, transfer of training and temporal aspects of practice. The contribution of feedback at all levels of behaviour directs the nature of knowledge of results, reinforcement and reward, error-correction and diagnostic teaching.

The art of teaching involves the ability of the teacher to recognize the demands of the learner in the learning situation. The cybernetic model offers a firm and meaningful framework for such an art to be fully effective.

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Left to right: Mrs. Ivor Burge, Queensland; Miss Ena Holland, Papua-New Guinea; Dr. John H. Cooper, U.S.A.; and Miss Margaret Sirrat, Sydney, enjoy a coffee break between Congress sessions.

A Thesaurus for the Science of Physical Education and Sport

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WITH the end of the Second World War, there began in Europe, through the systematic utilization of the collective specialized literature and through the accumulation of secondary documents, the acceleration of information output and of economic building. In more than 40 centres the national and a part of the international literature is documented. Most centres have arrangements to exchange publications among themselves and to distribute them to subscribing institutes or specialists. Till now this has been happening, and in Leipzig has been developed to perfection. It proved excellent so long as the conventional, non-electronic technique was capable of coping with the deluge of information. In the future the mechanical filing card index will no longer be sufficient, however, to equal the demands of speedy and planned research. This path to the future was first crossed at the University of Graz (Austria). There, since 1967, an automatic documentation is in the process of being developed. It has succeeded in demonstrating the convincing excellence of the electronic data processing in connection with the Mathematics Center.

Within a reasonable amount of time we will be capable of electronically accumulating and solving the research over a teletype machine. Regarding this initial experiment in Germany, we have decided, in addition, to introduce an electronic documentation of sports science and to found an information centre. The German Sports Union and the German Department of the Interior have already organized and financed this "Documentation and Information Center for Sports (DIS), so that the practical work could start in 1970. This work will not be done alone but in cooperation with the documentation centres of the German-speaking centres. Since an information centre has to be set up only according to the needs of its user, the interests were first explored.

In a survey a representative selection of potential users were questioned about their expectations, desires and requirements. The present

result makes it possible to estimate the kind and value of the desired information and to measure realistically the capacity of the central documentation.

Electronic accumulation and research requires a new type of "Thesaurus": a polyhierarchical order, no uniform but a multiform, open system, flexible, complete, and adaptable. Consequently by "Thesaurus" one understands therefore simply a collection of descriptions which are classified to facilitate the research. This index has therefore the character of a list that is easy to differentiate and to vary.

After the preliminary studies of the University of Graz a specialized "Thesaurus" was developed by me, which complies to the requirements and possibilities of an automatic information-retrieval system. With the structuralization of this collection, the recommendations of an internal convention in Cologne in 1967 were taken into consideration. It is based on the introduction and conception of a complex sports science which acts as an integrating science in cooperation with numerous related sciences. A knowledge of this model solves the problem of integrating the results of an established theory of this subject area into the whole. At the beginning it is necessary to include the neighbour or contact sciences into the documentation. Therefore, the first part of the Thesaurus contains a compilation of important concepts of the arts and sciences, which are based on sacraments for health education and sports. Through this compilation, structuralized fields have been formed which are modelled on the imminent classification of the contact sciences. This part of the Thesaurus can only become actualized in the documentation work when the volume of the literature utilization becomes considerably increased.

The second part contains the terms of the sport science in a narrower sense. It emanates from the fact that the beginnings of a sociology of sports, history of sports and psychology of sports are recognizable and that the sports medicine and sports education have already crystallized into independent disciplines. The compilation and grouping of these specialized areas was possible naturally only by the exchange of thoughts of specialists. As a central research area the abundant vocabulary of this movement is considered. The crucial point of the second part lies in the sports education, which is connected to the training instructions.

Now follows the largest section of the Thesaurus which contains the vocabulary of all types of sports. In order to alleviate the programmers of this work, the various heading groups had been parted according to single schemes. With the classification of material, first, the encyclopædia, rule books and prize-fighting regulations evaluated. This temporary collection was put before the sports officials of the special organizations for criticism and completion. So we might have succeeded in adapting the most variable part of the Thesaurus to the present level of development.

The retrieval system GOLEM (large accumulation-oriented, list organizing, inquiry methods) offers all advantages of modern EDP. At the University of Düsseldorf it is already in service in order to build up a literature documentation about philosophy (an endowment from the Volkswagen Corporation). That the East German Government has

ordered three EDP systems from Siemens proves the progressiveness of the system.

Through ribbons, the secondary programmes are transferred to the magnetic tapes of the electronic Large accumulator. The accumulated information is printed by the researcher of the computer, or is placed through the teletype to the disposal of the user.

The Thesaurus which I worked out meets the requirements of the retrieval system. It requires no classification and no fixation on standardized concepts. The structure is flexible and can be converted at any time. The catalogue of descriptions remains open and variably reducible and capable of being completed. With the questionnaire, the headings can be optionally connected so that a correspondence-machine is possible.

The length of the questionnaire and the number of insertions descriptions is unlimited. With an accumulation capacity of one million concepts, a question of 10 descriptions was answered in about 30 seconds.

There is no doubt that this automatic sport documentation belongs to the future. You are heartily invited to make use of the service of the Cologne Documentation and Information Centre.

Delegates in attendance at a General Session of the Congress.

The Application of Research Results to the Practice of the Physical Education

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LEARNING, which is the most important thing in the educational activities, can be defined as the positive activity for "graceful living". That activity is not an effective one until it is organized on the basis of scientific researches.

Assuming that today's physical education is located in the field of general education, we can say the same thing about physical education. In other words, learning in the physical education is done through physical movements. The physical education should, therefore, be organized on the basis of scientific researches for physical movements. Organization on the basis of scientific researches does not mean only gathering scientific reports.

Recently, specialization of researches is accelerated by the development of research technique and the increase of information. This trend is natural and necessary for the development of research itself. Each result of this specialized research must, however, be integrated for the purpose of application.

Those arguments can be compared to the "organic evolution". The form and the function of an animal have been differentiated through the history of organic evolution. At the same time, these differential functions have been integrated by the nervous system. Consequently, each specialized function can work smoothly in co-operation. Thus it can be said that integration must be done in parallel with specialization even in the field of research.

In this article I want to introduce our efforts.

One of these efforts is to realize where each research should be located in the systematized field of physical education. The next one is to re-organize the research for the purpose of effective learning in the physical education.

One of the problems which we have been investigating for more than five years is running. Running is an instinctive movement and also an essential one in everyday life. The studies on running, therefore, have been prompted by the production of artificial legs, the rehabilitation for paralyzed or injured persons or the establishment of effective training methods for sportsmen in addition to the simple interest in the movement. They have been carried out to a great extent from the kinematic observation to the kinetic analysis.

1. Kinetics of Running

As a first step for this research we devised a new instrument which was able to record the force variations exerted by a foot during running. Running is based on the movement of both legs. It is, therefore, essential to measure the magnitude of force exerted by a foot against the ground in order to analyse the mechanism of running.

The development of electrical engineering in this century has explored the new methods in which the force can be converted into electric energy. For recording, a physical movement varies in nature from a very explosive one to a gradual and continuous one covering an extensive range both in magnitude and velocity. In order to overcome these obstacles, we used the PIEZO effect of the semi-conductive crystal. When an external force is applied to a crystal, its electrical resistance is changed corresponding to the magnitude of force. Using this equipment, we recorded the pressure of the foot during running at various speeds on the treadmill.

Various aspects of running were then recorded, with the crystal fixed to the toes and heels of running shoes, and were as follows:

1. In running each leg alternates between support phase and swing. The various pressure gradients indicate that the centre of gravity of the body moves forward to the point above the supporting foot and the toe exerts the force which propels the body forward.

2. Step length increases according to the running speed up to 450 m/min and decreases thereafter, while increasing rate of step frequency to running speed increases more rapidly at higher speed.

3. The results of the kinematic analysis indicate that the maximum speed in running is limited at first by the maximum step length and next by the maximum step frequency.

2. Coordination of Running

At the next investigation we analysed the leg motion during one step from the viewpoint of electrogoniometry and electromyography. We have a 16-channel electro-polygraph which recorded the electrical activities of leg muscles and force curves exerted by the foot during running.

It was generally observed that the foot strikes the ground almost under the body. Therefore, this support phase is almost entirely propulsive. EMG shows that the extensors of the leg are remarkably active in the support phase.

Tracings showed that though the antagonistic activities of leg muscles can be seen clearly at moderate speed, the higher the speed the shorter became the intervals of electrical discharges of each muscle. At the maximum speed, electrical activities of extensors and flexors are continuously seen. The results indicate that there is a limit in the increase of step frequency.

3. Energy of Running

It has been reported that there is close relation between energy cost and running speed. As a matter of course, the amount of energy expenditure depends upon the quantity of muscular activity. The direct relation of muscular activity to speed, however, has never been revealed in running.

For the purpose of this analysis, we devised a new integrator. The response of the integrator to an input of constant voltage is that the increasing rate of output of the integrator is proportional to the magnitude of the input voltage such as 1mV, 2mV, etc.

Using the integrator rectus femoris and gastrocnemius were observed in the right leg during running at various speeds.

Our studies showed that the energy expenditure in running increases more rapidly than muscular activity according to the increasing rate of running speed. In the case of the hard exercise such as running, as the exercise needs the activity of the other functions in addition to the directly concerned muscles, the energy expenditure is necessarily over the amount of muscular activity according to the rate of speed.

Further experiments were undertaken with the subjects running with various cadences at different speeds. Running form was changed at a speed as follows: 1. Natural step; 2. Faster step; 3. Slower step.

Our studies showed that there was less electrical activity and less energy cost per step for the natural step than the other two. The energy cost per step was greatest with the slower than the faster step. It can be said that the effect of running form upon energy cost is within certain limits greater than that of speed.

4. Application to Physical Education

I have introduced our research mainly from the dynamic point of view in order to display how running is done. But another approach for running is done which is necessary to organize an effective curriculum for learning in running. It is a research for human ability. Namely, we can say that motion pattern is the objective and man is the subjective in physical education; therefore, man, as the subjective in learning, must be analysed through his growth and development.

The first approach for this aspect is to examine the relation between the ability of energy output and running speed.

The results from research findings indicate:

1. That the running speed maintained for a certain period must depend upon the amount of oxygen intake.

2. That the person who can mark a good record at 5,000 m. running has an excellent ability of oxygen intake.

3. That there is a linear increase of maximum oxygen intake of six-year-old boys to maturity. Hence it can be estimated that man cannot run 5,000 m. at higher speed until he becomes matured.

4. That the development of motor skill in running is almost established at nine to ten years of age.

5. Reaction time is generally recognized to indicate the development of the nervous system. One hundred and twenty boys used in our research had their reaction time taken from six to fourteen years of age.

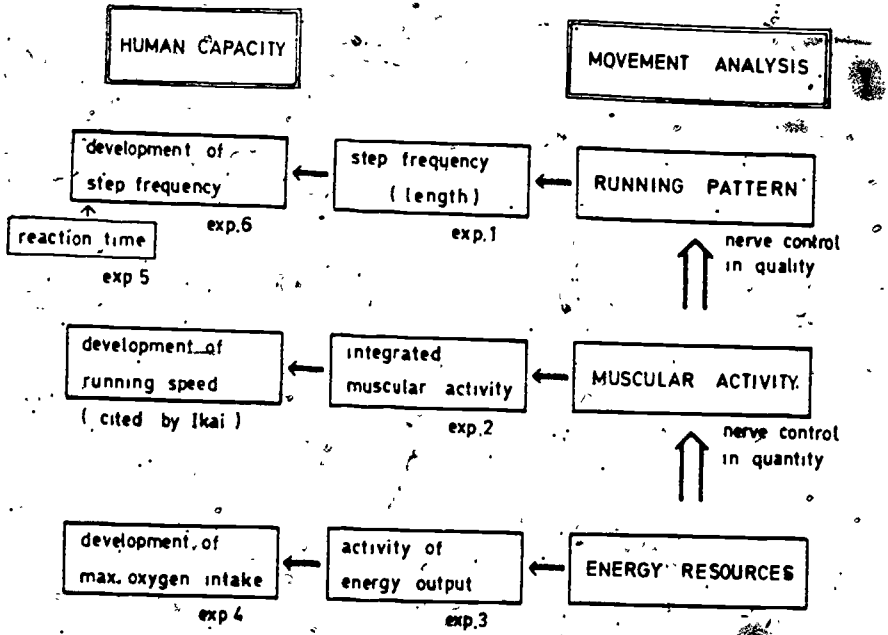

FIGURE I.

The results showed that 75% of total development is completed before ten years of age. This result agrees with those of development in step length and step frequency. Therefore, we estimate that since the nervous system which controls the physical movement is considerably developed before ten years of age, the generally used movement in life, such as running, is established before the same age.

From the abovementioned experiments, though further research would be necessary, I suggest an attempt to reorganize a new educational curriculum for running.

At first we will rearrange the results which we have revealed. Figure I shows the diagram of them.

Fundamentally, a certain amount of energy must be used in running; this energy should be supplied with physical resources stored in the body. Muscle transforms chemical into mechanical energy, namely, muscular contraction controlled by the motor nerve is conversion of potential energy into motion, moreover, the running pattern must be formed on the basis of the co-operation of nerve controls in timing, in spacing and in grading.

As for running pattern, experiment 1 indicates that the maximum speed in running is limited at first by the maximum step length and next by the maximum step frequency.

In muscular activity, experiment 2 indicates that electrical activities are increased according to the increasing rate of speed.

Experiment 3. pertaining to energy resources, indicates that the person who can run faster has an excellent capacity for oxygen intake.

Running is a movement to move the body as fast as possible; therefore, those three factors must be improved in order to obtain a better performance. As the human is the subjective in education, human capacity according to age must be taken into consideration in order to organize the curriculum.

As for energy resources, experiment 4 shows that the maximum oxygen intake increases with age up to the age of 18 years.

Regarding muscular activity, the data by Dr. Ikai shows that the maximum sprint speed on average increases progressively up to 16 years of age.

In running pattern, experiments show that motion pattern is considerably developed before ten years of age.

As is the case in most areas of education, there is a great deal of overlapping. The continuous process of learning—putting into practice, correcting, relearning and putting into practice—is the basis of our acquisition of skills. There must be, however, a variety of purposes through the educational processes; namely, a different kind of instruction should be mainly given during a certain period. The main purpose of instruction during a certain period must be determined by the integrated scientific researches.

I believe that human ability must efficiently develop if adequate stimuli are given during the right period. The right period means the period during which the functions concerning the ability are biologically growing.

In concluding this article, I want to propose a new curriculum for running according to our research results.

1. The instruction how to elevate one's step frequency with a certain step length should be mainly given before ten years of age. This is based on the development of the nervous system.

2. The instruction how to lengthen one's step with a certain step frequency should be given mainly from 11 to 14 years of age. This is based on the development of dynamic function of muscles.

3. The instruction how to keep one's running speed for a certain period should be given mainly from 14 to 18 years of age; this is based on the development of cardiovascular functions.

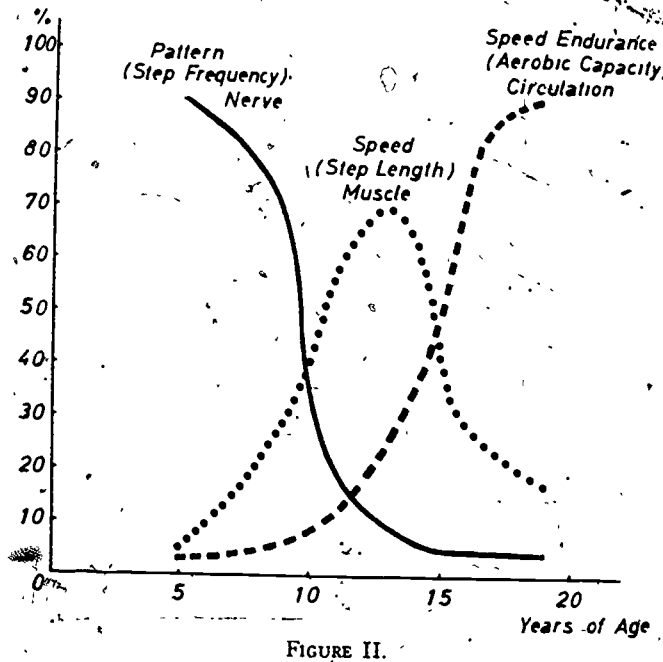

FIGURE II.

As I mentioned above, three kinds of lines show the overlapping process in advance with age in Figure II.

Physical Fitness Tests for Malaysian Schools

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My talk entitled "Physical Fitness Tests for Malaysian Schools" brings to you no more than a "Malaysian happening" in physical education.

Some time this month basic fitness tests will be introduced into the physical education programme of Malaysian schools. This marks an important milestone in the progress of physical education in Malaysia. The basic fitness tests will be taken by pupils of certain age groups and their performance recorded in individual record cards known as the "record of basic fitness". This project was conceived with the following objectives:

(*a*). To focus much needed attention on physical education in schools, with particular emphasis on the development of general fitness.
(*b*). To generate an awareness of the concept of physical fitness.
(*c*) To introduce some evaluative process in the school physical education programme.

Although physical education has been established as one of the basic disciplines with specific periods weekly, the subject continues to face formidable opposition in an examination-oriented curriculum. The idea that some "examination" value should be attached to physical education (how undesirable as this may sound) so that greater attention will be paid to the subject, was first discussed by the Technical Committee of the Schools Sports Council of Malaysia, the body sponsored by the Ministry of Education to look after schoolboy sports. A paper that was subsequently prepared was presented to the Ministry of Education, which, after giving it due consideration, recommended the scheme for immediate implementation. This acceptance of the concept of evaluation in physical education constitutes a major step forward in the teaching of the subject in schools.

Apart from the need to upgrade physical education, the basic fitness tests serve to stimulate pupils to condition themselves regularly and in the process become aware of the joy and benefits of being physically fit. Today, the subject of physical fitness has gone beyond the confines of the school. The public and national leaders have given serious thought to the pro-

motion of national fitness campaigns. Therefore, the launching of the fitness tests in schools is significant in its timing with the nation-wide interest in physical fitness and recreation.

Physical education as practised in Malaysian schools, seldom, if ever, comes in for any organized evaluation. The fitness test programme, limited as it may be, serves as an instrument of measurement that forms a necessary part of the teaching process. It is hoped that as the programme gets under way, interest in this area will be stimulated to the extent of stimulating further thinking amongst our local teachers and leaders of physical education.

Survey of Basic Fitness

In early 1969, a nationwide survey based on a pilot study was launched. A total sampling of 12,152 boys and 8,180 girls in the age range 11-18 years was taken.

The tests selected, listed below, were administered in two sessions in the following order:

1st Session:
1. Flexibility test.
2. Shuttle run.
3. Chinning (boys) and modified chinning for girls.
4. Leg lifts.

2nd Session:
5. Sargent jump.
6. Softball throw.
7. 600 yards run/walk.

State co-ordinators were used to brief the large number of personnel necessary for the administration of the tests. The processing of test scores and the development of standards using the Hull scale were completed in early 1970.

This programme is a beginning of an overall design to establish in our schools evaluation procedures in physical education in order to assess a pupil's progress in his physical development, participation in games and extra-curricular activities.

The authors of this programme are aware of the limitations and experimental nature of fitness and games skills tests, but if they bring about new thinking and participation from people who matter, the higher purposes of physical education will have been served.

EIGHTH CONFERENCE OF THE AUSTRALIAN PHYSICAL EDUCATION ASSOCIATION

The Fritz Duras Memorial Lecture:

Individualization—Specialization—Socialization: Three Aspects of an Educational Programme in Sports

LISELOTT DIEM

Professor, Chair of Didactics and Methodology, Deutsche Sporthochschule, Koln, Germany.

This lecture is given in honour of a man whose aim as a sport physician and physiologist was not only physical education and its methods but above all: man as an individual.

I quote from one of his lectures 1965: "Providing physical exercises that will lead the individual to the fullest possible awareness of himself; providing situations for the development and mastery of organism that will lead to the fullest possible control of the whole personality . . ." (iii) providing opportunities of devoting oneself completely to the achievement of a worthwhile objective, of enjoying the greatest adventure of all: to reach beyond one's own limitations, and so become "fully extended". So far we have spoken about the individual; we must now add that nobody could be "fully extended" who, with such extension, would not achieve positive and constructive contact with other human beings. Here, too, physical education offers distinct learning possibilities by: (iv) providing experiences and training for the development of desirable human relationships between individuals as well as between groups, and for the establishment of a proper balance of dependence, independence and interdependence. Please let me now try a new interpretation of these thoughts in memory of the great educator Fritz Duras.

Education reforms are discussed everywhere in the world to-day. Reforms within the university and school systems, reforms of the learning