

Training: what do we do now?

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Summary 1. Introduction; 2. The supply-driven era: the more training the better; 3. The end of the supply-driven era: no demand, no training; 4. Demand-driven training, *ma non troppo*; 5. The recipes for good training; 6. Training and education: complements or substitutes? 7. Private schools and private funding? How far can we go? 8. How do we decide whether training is good or bad? 9. How do we deal with training at the end of this century?

1. Introduction

This paper discusses training policies for the end of the century. The world has changed and training has been considered, in succession, a villain, irrelevant and a savior. How do we stand now?

Few countries paid any attention to training before World War II. But the fast growth and industrialization of post-war years led just about all countries in the world to create significant training systems. Training became fashionable and the more, the better. But the economic crisis starting in the 70s finished the era in which supply of training was the only concern. Economies hungry for skills and ready to hire anybody who was trained, became plagued by unemployment and slow growth, creating a need to worry about the markets for the graduates. From a world of supply-driven training, we moved to another in which wisdom means looking at the demand for skills before offering training.

Many countries still have not put the brakes on training offered without any concern for the employability of the graduates. The quest for demand-driven training is being heard but not everywhere. Yet, at the same time, the push for demand-driven training risks is going too far.

These simple recipes, at the same time that they have the merit of focusing attention on the most critical problem, risk going too far and becoming a simplistic panacea. Indeed, training cannot be a passive response to manifest demand. Often it needs to be more proactive. Moreover, exclusive attention to costs and markets leaves behind many serious problems in the supply side of training.

To sum up, at first there was oblivion, then a frenzied race to train more and more. But this push was carried over beyond the point where markets could absorb the graduates. Now it's time to retreat and have the demand drive the supply of training. But this principle risks going too far and may lead us to forget both the limits to a purely demand driven policy and the need to look inside the black box of training. These are the ideas exposed in this paper.

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2. The supply-driven era: the more training the better

As is the case in other areas, training policies are subjected to pendulum movements. Now it moves in one direction and, eventually, moves too far, then it turns back and also ends up exaggerating.

For many years, training was a matter of charity. A sizable part of vocational training schools started as schools for the orphans and the poor — since neither had the means to pay the fees charged by a master who would take them for an apprenticeship. Hence, the persistent low status of a significant part of this training and its lack of importance in public policy.

But those countries that had a fast process of industrialization soon discovered that it was not possible to learn on the job when manufacturing grew too fast. For instance, the decision to create a large factory — such as the Siderúrgica Nacional in the Paraíba valley — created the need for thousands of well trained workers within tight timetables. In the neighboring region there was nothing but cattle and coffee plantations. From whom the new workers could have learned the trades required by a mammoth steel mill? Hence the need to create structured training programs in order to respond to a sudden increase in demand.

After World War II, countries such as Brazil increased the pace of their industrialization. Therefore, it is no surprise that major training systems were created there. Before, there were isolated initiatives here and there. Perhaps an arts and crafts *lycée* or the vocational school of the railroads. But in the post-World War II years, practically all countries that wanted to try their hands in manufacturing created their training systems, which followed naturally the style of the colonizing powers. In countries where French influence was strong, vocational and technical schools followed the models of France. Equivalent transplants happened in British colonies. Latin America — including Brazil — mixed the overwhelming educational traditions of France with those of Germanic training (as a result of chance events, Brazil had a strong Swiss influence in the creation of Senai, which spread its gospel to most other Latin American countries).

But everywhere, there was one rule for trainers to follow: grow! After all, this was a legitimate priority. Industries were being created and there was no tradition of industrial trades to be replicated at the workplace. Only schools could provide the trained labor required. The problems were straightforward: train instructors, translate, adapt and prepare training materials, build schools and purchase equipment at the fastest possible pace. But also, procure the budgets to pay the growing bills.

Many generations of trainers and administrators have learned and practiced these priorities throughout their working lives. There was nothing intrinsically wrong with them. The countries needed trained people and needed them quickly. Those in which industrialization changed their economic landscape developed sizable training systems — despite major differences in style and organization. Those who merely substituted a few imports only developed small systems, which in many cases were not large enough to saturate their own markets for skilled workers.

3. The end of the supply-driven era: no demand, no training

In the 70s, crisis struck the world economies, triggered by the precipitous increases in oil prices. Growth subsided, inflation jumped and unemployment became a permanent fix-

ture of most economies. As a result, training no longer was in short supply, except in the few countries that continued to grow at very fast rates — such as the South East Asian “dragons”. From a situation in which the bottlenecks were in the supply side, we have since lived in a world in which demand is slower and more elusive.

Yet, trainers and administrators brought up in an environment of scarcity of training and endless opportunities for the graduates are having great difficulties in overcoming their conditioned reflexes. They tend to remain locked in their regards and dedication to supply issues. They cannot retool their reflexes to understand that the big problem now is to find jobs for those whom they train. While a new generation of trainers has been persuaded that this is now the real priority, the old hands around the world still refuse to seriously consider the labor for the graduates.

Around the world, vocational schools produced graduates that could not find jobs. That of course, did not deter the administrators of these institutions, for the simple reason that they never thought that getting them jobs was their business. They went about their business of training more people, limiting their preoccupations to the training materials and to the technical aspects of the schools. The only demand they saw was that coming from the students who saw a tuition-free and easy-entry institution as their only hope of staying longer in school.

Industrialized countries were not particularly better off in this respect. In fact, there was a strong tendency to offer training as a remedy to people who could not find jobs. The myth that training creates job survived for a long time. Nevertheless, these countries have, to a very large extent, readjusted their training to the realities of the labor markets and understood the futility of spending in training, in the hope that this will create jobs. By contrast, the less developed countries have been a lot less capable of reversing the old tenets of supply-driven training.

As a reaction to the lack of attention to the employability of graduates, the late 80s saw the inauguration of a new school of thought. Demand-driven training was the new word of order. The rule is simple: no demand, no training. In other words, the demand for training has to be closely monitored and only that training which responds to a clearly identified demand should be offered. No more, no less.

One major player in this area was the World Bank, which has been lending important sums of money to training and noticed that many countries were requesting new loans, at the same time that their existing programs could not place their students in reasonable jobs. By preparing and widely distributing its policy paper *Vocational and Technical Education and Training*,¹ the World Bank became the champion of the “demand-driven movement.” But, at the same time, the ILO was also publishing papers telling countries not to offer training without ensuring that there was a demand for those skills.² Out goes the pendulum in the opposite direction.

An increasing awareness of the new problem of tuning training to existing jobs is developing. But there are still too many of the old generation of supply-driven trainers and too many graduates finding no jobs and, hence, much justification for the insistence on the need to obtain conversions to demand-driven training.

¹ Washington, D.C., The World Bank, 1991.

² Kanawaty, G. & Castro, Claudio M. Towards an employment-oriented training policy: an agenda for action. *International Labour Review* (6), 1990.

Some Ministers have been converted and their official speeches already incorporate the demand-driven mantras. In fact, some countries have always done better than others in this respect. The industrialized countries of Europe learned earlier to adjust supply to demand and, of course, in the German speaking countries, the prevailing apprenticeship systems are immunized against such problems (no jobs for apprentices, no program). The same can be said of Chile, which has been a laboratory for neo-classical economics.³ To a very large extent, the Brazilian Senai and Senac are also relatively well protected, being both owned by employers' associations which are the same people who hire the graduates.

This is the right direction to go, no question about it. Yet, the pendulum does not stop in the middle. It always wants to go too far to the other end. The main issue taken by this paper is the need to redress again the balance. Demand training is still the way to go. But we risk going beyond the reasonable and finding new sets of problems.

Facing what is perceived as a serious problem, the main concern becomes its correction and all attentions focus on it. But problems do not disappear because someone has identified them and invented a solution. People do not listen readily, do not want to listen at all nor are they easily convinced and ready to change course. Therefore, energies end up being focused on this particular issue, to the exclusion of most other concerns. And so, by the time that the critical mass to start change is obtained, it sets in motion a process that eventually will have to be stopped, lest it goes too far. And in general, it goes too far. This is why we see so many times the pendulum swinging back and forth.

Waiting for the demand to appear and then responding to it with the right training is proper behavior in a world plagued by training programs that run amok, producing people who either get jobs that do not use their skills or no jobs at all. But there is more to training than this. The world of training is too complicated to be satisfied with this simple rule. Following to the letter a demand-driven policy would be a recipe for disaster.

If the world is complex, why should we expect training problems to be simple? While the overarching problem of creating jobs for all is as serious as ever, increasing world competition and the nature of the new production technologies make training more critical to ensure the required levels of productivity. In other words, it is becoming harder to match training to demand, but those unable to do it are doomed to remain behind. In fact, training is now more than a faster or more convenient way to impart simple work skills to a youth. Instead, it is a means to disseminate new technologies and better ways of producing. This is one of the core ideas of the present paper.

The pendulum swings away from the myopic supply-driven styles of the past. But it goes too far. Before, trainers were closeted inside their workshops, thinking of tools and pedagogical methods, as if the outside world and the markets for their graduates did not matter. Now, economists look at costs and the markets, completely forgetting what is inside training centers, how they work, what are the critical contents to be taught. The training process becomes a black box. Some find that understanding it is not a worthy pursuit.

³ Alejandra Cox-Edwards, co-author in Sector Strategy Report (LATAG), World Bank.

4. Demand-driven training, *ma non troppo*

To ignore the economic aspects of training is a gross error that nobody can afford to commit. Training is usually expensive. In addition, it can be offered under formats that generate wild differences in costs. But also, training is expected to yield results which are commensurate with the costs required to offer it. If it does not, why bother to offer it?

Yet, there is more to training than the bookkeeping of its costs and immediate consequences. There are results which are difficult if not impossible to measure. There are long run considerations in which the results are so intertwined with other changes that any attempt to isolate them is pointless or misleading. There are matters of equity and broader political considerations.

Training produces externalities. Some of its consequences are not reflected in the results obtained by those who pay for it. Hence, ignoring these externalities would lead to a chronic scarcity of knowledge and skills, with serious consequences on the technological levels of the economy. Market imperfections also reduce the ability of different groups to finance training, with bad consequences both for efficiency and equity. Lack of information about the impact of skills on productivity is another source of market imperfection. This section examines some of these limits to the rule of demand-driven training.

Training in times of unemployment and crisis: what to do if there is no demand?

The most perplexing tests for the demand-driven policies are offered by periods of economic crisis and unemployment. In the downturn of the economy, too many are left without jobs, including those who took vocational training. Should the government close schools and dismiss instructors because there is no demand for the skills?

“Supply-driven trainers” will always claim that observed excess capacity is a temporary outcome, due to the downswing of the business cycle. They may be right or they may be merely protecting their jobs.

Unfortunately, there are no good answers. Only the most general criteria to deal with this problem can be formulated. Most countries refuse to close down schools or drastically reduce enrollment while their economies are in the downswing of a business cycle. The issue, of course, is to be able to differentiate the business cycles from long run tendencies. During periods of prosperity, excessive expansion of supply often takes place, and it is pointless not to eliminate it in the trough of the cycle.

Militating against a drastic reduction in capacity is the need to preserve intact the training machinery. It takes time and money to train trainers and fine tune programs. Closing them will leave the country unprepared for the next cycle of prosperity.

Many countries have been facing chronic unemployment — both with positive and negative growth rates. What to do with training under those circumstances, when there are no reasons to expect full employment in the visible future? Again, there are no good answers in sight. Yet, there are known wrong paths to be avoided. Training does not come cheap. In fact, it is necessarily more expensive than academic education. Offering training to keep people out of the streets is not a good solution. It costs more, it devalues training, making it less effective, and it does not create employment. It is better to have training always focused and responding to market needs while leaving a larger proportion of students longer years in academic education. But, of course, this is not tantamount to promising or securing school vacancies in higher education. It is not a brilliant solution but the lesser of two evils.

Demand-driven, supply-driven or supply-created demand?

It makes no sense to train people who are not going to find jobs. But accepting this sound principle does not imply a passive attitude of having training institutions merely responding to the loud and clear demand of enterprises and downsizing their training efforts if this demand is too meager.

There is a way out, that is not at all different from what aggressive enterprises do when they are not happy with the level of demand. Creative enterprises try harder to market their products and invent new products, in the hope of creating a new demand for them. They never take demand as a given.

To take recent examples, there was no demand for Apple's Digital Assistant. Yet, this product was created because Apple thought that they could create demand for it. It expected to convince prospective customers that they could not live without a pocket device where they can handwrite notes and retrieve information. The same with CD-ROMs. Who can live without an inexpensive half a gigabyte memory where an entire encyclopedia can easily fit?

By the same token, good training is to many enterprises an unknown product that they are reticent to buy. It is up to training institutions to convince them that they will benefit from the investment. It is not a matter of producing training for which there is no demand (this remains a bad idea). Instead, it's up to the marketing of training to create its own demand.

Most enterprises are neither enlightened, competent or foresighted when demanding training. They are skeptical as to the impact of training. Left to themselves, they tend to be quite conservative and reticent towards training. Aggressive training institutions do not take this circumspect demand as a given, instead, they try to persuade firms that their products will increase their productivity and improve the quality of their products (of course, in some cases firms are right, the poor quality or poor targeting of training may make it indeed useless).

Some training institutions even mention explicitly the "door to door" salesmanship necessary to convince traditional enterprises. They feel that once they "taste" good training they will be hooked. This seems the way to go. There is ample — but non-systematic — evidence that entrepreneurs underestimate the potential of good training as a means to increase productivity.

The old patriarch who owns the stove factory in Morocco is a very conservative manager, essentially a merchant who began manufacturing the products he used to import. However, when economic crisis drove down the wages of graduates of vocational schools, his son convinced him to hire some of them. After all, at the same price why not hire trained workers? A foreign consultant used these younger workers in a new assembly line in which workers assembled the entire stoves (and signed their names on it) rather than add a piece or two along a conveyor belt. Productivity and quality jumped with the new system. The old man had to admit that his other workers were not able to adjust to the new system, since they lacked the required frame of mind.

Training as a transfer of technology

Perhaps the most important and misunderstood aspect of training is its potential role in transferring technologies hitherto not mastered by society or by some groups. We can think

of training as a more efficient means to prepare seamstresses or electricians to wire a house. In this case, training is an alternative to convey skills. Since it is not the only alternative — on the job training is another possibility — unless it has clear economic advantages over the other alternatives, there are no good reasons to choose it. Hence, it makes much sense to think of cost-benefit and cost-effectiveness analysis as critical tests for training (see section 7 for further discussion of the subject).

However, training can be far more than that and much of the current analysis underplays these aspects. In some cases, training is a convenient conduit to transfer technology and to alter the way people produce or think. In these cases, it should be evaluated by its broad impact on society or on some segments of it. Costs and benefits (measured by wage differentials) are just one of the results of training. Often salaries may be the least important of the benefits.

Economists speak of external economies when the benefits of some action are not properly rewarded by the market. But many human resource economists do not find them very often in training. It is my contention that externalities can sometimes be far more important than the direct effects of training.

Usina Esperança sits in the hills of Minas Gerais. In the 50s, to reach the first major city required a three hour drive on a dirt road or five hours by train. It was one of the pioneering firms in the production of pig iron, even though it had expanded its activities to include iron and steel casting, as well as a machine shop with one hundred workers. But that machine shop kept standards of craftsmanship, cleanliness and quality equal to those of any similar European shop. Yet, none of the workers had ever set foot in a vocational school. How could those backwoods machinists be so competent? The reason is simple. Decades earlier a Czech technician was hired to be the head of the mechanical shop. Meticulous, a perfectionist, hard working and dedicated, he trained dozens of machinists directly and subsequently kept a fierce eye on his disciples, as they taught the succeeding generations what they learned from him. As generations succeeded, many hundreds of workers were trained in the workshop, some of them setting up their own shops in the neighboring town or elsewhere. If someone were to estimate the rate of return of the investment in training the technician Jan Hasek, what results would it show? The direct effects would indicate probably negative results, as he was trained in a high wage country and received his salary in low Brazilian wages. However, how much is worth the difference between hundreds of mediocre craftsmen and the same number of first quality craftsmen?

When workers are trained to work differently, with different machines or with different techniques, training is the means to import a new technology. What matters is not how much they earn but how significant for industry or society is the mastery of these new technologies.

Singapore is often cited as an example of good training. What is less often mentioned is the deliberate misfit between supply and demand of skills. Singaporean schools produce workers who are ahead of the local needs. Not much, but nevertheless a bit more equipped for dealing with the new technologies than required by local industry. The idea is to induce the adoption of more modern technologies by anticipating the demand of workers capable of dealing with them. In particular, the country encouraged the creation of technical schools by Japanese and German cooperation. These schools bring in the latest in the technology of

these countries and are used as a means of diffusing them locally. Moreover, Singaporeans encourage the presence of expatriate instructors and the entire replication of the features found in the countries of origin of these schools, so that their students can learn the work habits and industrial organization traditions of these countries. In other words, like experimental agriculture stations that bring in exotic species to be adapted and disseminated, these schools bring in technology, values, organizational standards and everything that goes with it. In an experimental station, it is meaningless to compare the cost of producing a local variety of soybeans with the market value of these beans. The goal is to create beans that can become seeds to be used by thousands of farmers. Success is being able to change the productivity of these farmers, not producing cheap beans in the experimental plots. By the same token, Singapore is not comparing the costs of these fancy schools with the salaries of its graduates. What matters is the productivity of an industry that can adopt more advanced technologies sneaked in by the schools.

In fact, in some particular cases we may find that training is nothing but a strategy to bring in technology. This is what is involved in firms that purchase technology from others. They often send their technical staff to the selling firm so that they can be trained in the new techniques and procedures.

When the Norwegian oil corporation started its offshore drilling activities in the Northern Sea, the first step was to purchase the technology in England. In order to transfer it back home, a number of Norwegian engineers were sent to the British Isles to be trained in offshore drilling. Upon returning, they used the recently acquired skills to start the local offshore activities of their enterprise. Conventional cost benefit analysis would have told us to look for salary increases and check if they were commensurate with the price of the training. Well, the training was probably very expensive as it was not real training but the purchase of proprietary technology. And the salary increases would have been marginal, if any. These were staff of the firm who were sent to England to pick up what the firm wanted them to learn. The cost-benefit ratios would have been highly negative, suggesting that this was a bad investment in training. Yet, thanks to this investment, Norway today has an offshore petroleum industry.

5. The recipes for good training

One does not become a skilled worker just by acquiring manual dexterity. The mind and the soul also have to go along. In the most glorious periods of supply-driven training, often there was more concern with quantity than with quality. For different reasons, there is now too little emphasis on understanding the recipes for good training. This section explores some of the core issues determining the quality of training.

The vicious circle of shoddy workmanship

“The first step (...) is training the eye to discern quality. This is the step that brings us to do things better (...). But the eyes’ ability to see errors soon outstrips the hand’s ability to correct them, so the eye nags.” (Richard Manning)

There are many thousands of well-equipped workshops in vocational schools around the world. The machines and the tools are there, as are the diplomas of the shop instructors. They are not less equipped in diplomas and tools than the corresponding vocational schools in Europe. Yet, when we look closer at the work done by the students, the differences stand out: they are horrible. The way the tools are treated, sharpened and stored is also telling. And the overall cleanliness of the shop is equally different. Moreover, all these things go together. We do not see good work and sloppy maintenance of tools and machines. The whole thing comes together in a package.

When asked about dull blades and gaps in joinery smeared with wood filler, instructors in poor workshops will explain that these are beginning students, still unable to produce good work and to properly sharpen their tools. Yet, a visit to equivalent workshops in Europe will show perfect joinery and sharp tools.

The novice student in an Arab vocational school was trying hard with his file. But his body position was not right and his hands did not follow a straight line pattern — strictly required since he was filing a true surface. Instead, his file rocked up and down, with the unavoidable consequences on the shape of the steel plate being machined. Not speaking Arabic, the visitor imitated the student in his clumsy movement, to call the attention of the instructor. The reaction was quick. The student was asked to stop filing. A few weeks later, the same visitor was watching a sheet metal shaping class in a Geneva vocational school. The instructor detected some indecision on one of the students. What a chance for him to demonstrate his own skills! Immediately, he took the place of the student and made a swift and elegant demonstration of the operation, as if that piece of copper sheet were anxious to become a cone and only needed his encouragement.

One instructor stops the students and does not dare to demonstrate. The other relishes the chance to perform like an actor on stage. What will the students learn from each instructor?

The difference, of course, is not in the tools or the diplomas but in the instructors. An European instructor is essentially a first rate craftsman. His own work is perfect. He is obsessed with good work and will not accept anything but that from the first week. His diplomas are quite immaterial.

The visitors stopped at a roadside mechanical workshop in Isfahan. The shop is not particularly different from hundreds of others in the same neighborhood. It has a lathe, an old jury-rigged shaping machine, oxy-acetylene and arc-welding equipment, a drill press, a grinder, a compressor and the tools that go with this all-purpose workshop. It produces a machine that extrudes the common plastic bags that are used for packaging. But the owner also had on the side another small factory that used his own equipment to produce plastic bags for the local market. Vertical integration, one might say.

The owner has been training his two apprentices for the last two years. They can use the hand tools and can operate the lathe. They are able to measure a threaded axle and find the proper carriage advance setting in the lathe for reproducing this thread on another similar axle. They work fast and with some sense of confidence.

This is the way it happens in millions of workshops around the world. One day these two apprentices will be considered masters and will have their own apprentices. They will teach what they have learned in these years of contact with the master.

But there is a catch. They have learned the occupations of turner and machinist from a man who has not truly mastered them. The owner is a graduate of a technical school of mechanics and had some workshop experience on the side. But a technical school does not prepare a machinist or a turner. It prepares someone who knows about machines and can talk to craftsmen. And his apprenticeship at another enterprise also failed to produce a good mechanic, because the other small shops around share the same shortcomings.

In the equipment they manufacture, the plastic pellets are poured into a sheet metal deposit, constructed by welding the sheet metal. The welding was irregular, with a rough finish. Enough to hold the piece together but not pleasant to look at. The main shaft requires the more critical welding of a rod into a cylinder. The joint may withstand one hundred years of abuse but a serious welder would be horrified with the work. The lathe work shows the typical mushy finish of poorly prepared cutting tools. Indeed, a cursory inspection of the tools revealed that some were not sharpened properly and that the welding of a carbide bit on the tool holder was amateurish at best. Some of the wiring of the heating elements was precarious at best. The overall finish of the machine denounces the low level of craftsmanship of the owner. During the visit, one of the apprentices was working at a grinding wheel without safety glasses, a very common but very stupid practice. The entire workshop looked careless and messy, a capital sin in the ethics of a true machinist. What are the lessons from this innocent visit?

Bad habits reproduce themselves through generations of sloppy workers. They set the level of the local technology and the limits to what can be done with it. This is the vicious circle that neither apprenticeship nor cheap and amateurish vocational training can break. Technical schools, no matter how expensive, are not the solution either, since they do not prepare craftsmen but academics with rudiments of manual work.

The vicious circle can only be broken by truly high quality craft training. This training is not cheap, although it does not have to be extravagant or wasteful. It is not a great mystery either. All industrialized countries have it somewhere, with grouchy masters preaching the catechism of quality and perfection and demonstrating by acts what this means. Some developing countries have it too, thanks to a favorable set of circumstances or to a deliberate effort.

How do we decide if the creation of this virtuous circle of high craftsmanship is worth the effort? Certainly not by measuring the wages of the graduates and comparing with costs, since the important consequences of their work are the creation of a technological culture, the imposition of higher standards of what is and what is not good work and, last but not least, their tasks as teachers of a newer generation of better apprentices. Their wages do not capture the long run consequences of what they are doing. These indirect effects are — of course — external economies. And in this case, external economies are all that matters. This is a case of transfer of technology (from high skill environments to roadside shops). The workers trained in the process are the vectors, the carriers of this transfer, not the ultimate goal of the process. Only a small proportion of the trades fall into this category. But they

happen to be very important to any country that wants to go beyond the repair of toilets and flat tires.

There is a vicious circle of lack of quality. Instructors in many countries have learned from other instructors who also had plenty of pedagogical or technical school diplomas, but were not proficient craftsmen themselves. Their students will perpetuate a dynasty of incompetent instructors with diplomas which are valid from a legal point of view but are worthless as proof of competence in what they teach.

The visitors to the training center that prepares instructors to teach in the national vocational schools arrived at the welding and mechanical shop. The instructors proudly showed the work done by their disciples, who were themselves shop instructors undergoing a retraining program. It was difficult to keep a straight face when examining these pieces. They were simply unacceptable even as work of beginning students in any vocational school in Western Europe, Singapore or Brazil. When we think that this is what instructors manufacture and that it is proudly displayed by the instructor of the instructors, it becomes easy to predict that the vocational schools in this country will never produce good workers.

What diplomas tell is that its bearer has gone to school for the period required to deserve that piece of paper. If he has gone to a school that values paper and pencil more than files and workbenches, what happens at the school he teaches will bear witness of the misfit in loyalties.

This vocational school was about as derelict as one can find just about anywhere in the world, despite the fact that the equipment was not cheap. But the roof was falling, bird droppings competed with the desert sand to make the machines look dirty. The furniture built by the students as a requirement to get their trade certificate was frightfully crude and poorly finished.

The auto-mechanic instructor was disassembling a gear box. Upon detecting the approach of the visitors he quickly ran to his tool box and replaced the regular pen hammer he was using to remove a gear with the appropriate brass hammer. However, he was still hammering that gear with a screwdriver, a capital sin in engine work. He also did not have time to clean the work table which was covered with a layer of desert sand mixed with gear oil. The visitors asked to see the notebooks of the students. Despite the fact that they were at the lowest end of the vocational schools, the Arabic calligraphy was beautiful. Not one tidbit of grease on the papers, no ears on the notebooks, no scratches or ugly corrections. Ultimately teachers teach what they value. Arabic penmanship is a noble endeavor. But it is easy to predict that these students will present their clients with elegantly penned bills, charging for the overhaul of gearboxes that now contain a good sampling of desert sands.

However, not all developing countries are turning around this vicious circle. Countries like Brazil and Singapore — and to a lesser extent, Tunisia — have been able to latch on to the virtuous circle of good craftsmanship. Their students can produce pieces of respectable quality.

But one thing is clear. There is no way of lifting oneself by the bootstraps. Countries that are doing well in these areas started by bringing in workers who were first rate craftsmen. They were the ones who started the dynasty of excellent instructors. And a dynasty of

excellent instructors creates a dynasty of excellent craftsman in industry. When a non-Senai graduate teaches good working habits to a new worker, there is a fair chance that he learned them from someone who was trained by Senai.

When Senai was created, one of the instructors brought in to help was Robert Mange, a Swiss engineer from the Zurich Polytechnic Institute. This was a true Swiss from the Jura, where the watch-making industry of that country was born. Mange stayed around for decades, pushing his Swiss obsession with quality, neatness and craftsmanship. Senai grew way beyond his reach, but his ideology of quality and his obstinate insistence on cleanliness of workshops spread and remain the hallmark of Senai. When relating this anecdote to a Per-nambuco administrator of Senai, his face illuminated and he said: "Now I understand why all these instructors are maniacs about cleaning the machines and the shops!"

Training as a religious experience: the soul of vocation schools

"Tools are like leather-bound books in that they hold an aesthetic appeal separate from their use. Finely machined steel meshed to power through crisply ground gears is beauty that transcends our idea of the aesthetics." (Richard Manning)

Some of the obsession with cleanliness seems unnecessary to the uneducated eye, and from a strictly technical point of view, it is. But as in a religion, this is part of the liturgy, you are just not allowed to decide that you like the communion but don't like the confession.

Values, motivation and respect for their occupations result from a deliberate effort to cultivate them, not from the titles of the disciplines taught. Good training requires close intimacy with tools, but one also has to learn to love them. Unless the ethos of the school is conducive to this non-cognitive development, everything else is doomed to failure. Schools dominated by academic teachers (and *ethos*) cannot convince their students that the trades they teach are serious endeavors.

In the early 70s, Brazil created what were then called Ginásios Orientados para o Trabalho (Work-oriented Junior High Schools). These schools mixed regular academic curricula with some trade instruction and catered predominantly to the same middle and lower middle class clientele that were attending middle schools at that time. The idea was that these students, at the same time that they were offered regular education, would learn practical skills. However, a survey conducted at the time indicated that 99.5 percent of the students enrolled had no intention of working in the kind of trades being offered. Very clearly, the middle class ethos of the students and teachers crushed what little interest these students could have in manual occupations. Even the small proportion of students from the working classes were not interested in occupations similar to that of their parents.

Just as interesting was one school near a large textile factory. This school, where working class students predominated, was the only one in which there were some students interested in manual occupations. But among these, some were of middle class origin. In other words,

*the social environment of the school conditions the interests of students who pay little attention to the original intentions of schools planners.*⁴

A mechanical shop instructor dressed in white shirt and tie is telling something to his students who are in coveralls. Since his clothes are not appropriate to the work in that shop, he is telling them that he can do better than get his hands and clothes dirty in that kind of work. He is creating a role model that is incompatible with the occupation being taught. How can that program create proud and competent workers?

6. Training and education: complements or substitutes?

In line with what was said in the previous section, just as is the case with education, training is a lot more than teaching people how to file, to saw and to hammer. The present section deals with the non-hammering side of training, exploring the links of training with education. It also explores the meaning of the poorly understood concept of overspecialization and the possibilities of interchanging vocational and academic education.

All we need is a good academic education?

After observing the abysmal results of vocational education in many countries (typically Africa and some Arab countries), some economists concluded that it is better to have a general education and learn the rest on the job.⁵ This view has spread and risks becoming a dogma for those who dislike training.

The problem with it is that while it describes a frequent situation, it is by no means generally true. There are no necessary reasons why a graduate of a vocational training institution should earn more or less than someone who has a secondary diploma. And indeed, this is not the case in many countries.

For instance, in Iran and in Russia the worst possible preparation to face the labor market is a secondary diploma. Graduates of vocational and technical schools are much better off.

But looking at the issue from the point of view of the skills they bring to the labor market and the possibilities of learning on the job, it is easy to conclude that the possibilities of learning properly a trade on the job depend very much on the nature of this trade. One can learn typing or office occupations along the way. The same is true with many relatively simple occupations. Others, however, do not lend themselves equally well to on-the-job learning. This is particularly true of the metal trades, electronics and many others which take a long time to master and increasingly require a technological and theoretical background to go with it.

There are many mechanics and even tool and die makers who learned on the job. Yet, they tend to have obvious shortcomings in their preparation, tend to develop bad habits, lack

⁴ Castro, Claudio M.; Assis, Milton P. & Oliveira, Sandra. *Ensenanza tecnica: rendimientos y costos*. Montevideo, Cinterfor, 1978. ch. X.

⁵ Psacharopoulos, G. To vocationalize or not to vocationalize? That is the curriculum question. The World Bank, 1986. (Report EDT 31.) See also by the same author From manpower planning to labour market analysis. *International Labour Review* (4): 467, 1991.

some techniques and have an overall deficiency in drawing, instrumental calculus and a full grasp of materials. This is not so bad when they have relatively high levels of education, access to training materials and work in firms where there are other better skilled workers to teach them. This, of course, is not true in small enterprises and in societies lacking a good tradition in these occupations. Ultimately, this situation is not different from those described previously when we discussed training as a means of introducing new technologies.

The fuzzy borders between education and training

“Carpentry is, in its initial and all other stages, a meditation. Carpentry is not so much a skill as an attitude, a discipline, a full-body commitment to the level, the square, and the precise. A task of building seems to flow best if it first flows deeply thorough the head and then the hands.” (Richard Manning)

Educators are fond of emphasizing the differences between the noble and lofty subjects of an education and the pedestrian and shallow manipulations of training. But this is an eminently misleading differentiation.

Unfortunately, most trainers are unable to respond appropriately to this semantic challenge. Worse, they are obfuscated by the elegant and arcane speeches of educators and sometimes try to change their programs in order to mimic academic schools, instead of using their richer work environment to reach equivalent or better results.

This seems to be happening with Senai, which is accused by educators of trying to domesticate workers instead of educating them. Rather than responding by showing what they really do, some of Senai's pedagogical staff are considering abandoning the traditional “methodical series” on behalf of a more “modern” method.

But the fact of the matter is that good training can also be a good education — only bad training is not also an education. The practical and motivating subject matter of training is an ideal support to develop contents which are at the core of a good education. Reading comprehension, calculus and physical principles can be seamlessly built into technical and workshop subjects. For students who are not particularly at ease at the world of abstraction, this is a better way of developing their basic cognitive skills.

The educational content of training can be hidden in the practical work in such a way that superficial observers do not perceive it is there. But the better it is hidden the better it works. When one has to read in order to understand the project, use math and formulae to prepare it, go to the drawing board to have a blueprint and write a report describing the results, this is the essence of basic skill development.

The methodical series of Senai are a very good example of how to blend practice with basic conceptual skills. But since it has not been revised in the last several years, it falls short of what could be obtained by integrating education with training. From the point of view of planning this merger, much effort and sense of purpose is necessary. It does not happen by accident. But the better done, the less the student realizes the amount of education smuggled in. However, the changes to be introduced to the present methods are relatively simple. In fact, the São Paulo Senai is beginning to do it. This is a far better idea than having vocational schools mimic the academic curricula by adding stand-alone and pretentious mathematics and physics courses which will not fare any better than their counterparts in the academic schools.

M. Gonthier was the creative and restless director of the Ste. Croix Technical School, one of the most interesting and less conventional technical schools anywhere in the world. In Ste. Croix, all the students work in R&D projects to develop and increasingly complex flexible manufacturing island. When asked how should vocational training adjust to the new technologies, he mentioned that students of conventional training have to read some materials, do a few calculations, draft the projects they will build and write a wrap-up report. In the case of preparing workers for the new technologies, it is very simple. Instead of reading a little bit, students have to read a lot more. By the same token, they will do more calculus, more drafting and write a very large report instead of a short one. That is all there is to it.

Overspecialization: process or outcome?

Many observers of vocational training evaluate the degree of specialization — and overspecialization — by counting the number of different trades offered by a training system. To them, Russia is the ultimate sinner, with over 800 trainable trades. Germany with close to 400 is also seen as an extravagant contender.

But we can also look at the consequences of specialization and ask to what extent specialized workers are stuck to their original trades, being incapable of moving from one occupation to another. Ultimately, this is the reason we are afraid that specialization may become overspecialization. If workers are stuck, they are overspecialized. If they change occupations and readapt quickly, they are not overspecialized.

It seems that two main factors are at play in determining either outcome. The first is the duration and quality of the general education that precede occupational training. Obviously, the longer and better the previous preparation, the less occupational training locks people into occupations. The second has to do with the nature of the training that is offered, as well as its duration. The issue is not so much the number of trades offered but the structure of the curriculum offered. How far is specialization delayed inside the vocational school curriculum? Courses that include a sound basic skills background and that combine hands-on activities with conceptual development may focus on a relatively narrow subject and yet, prepare for a broad range of future occupations. A good turner can become a good milling machine operator in little time if he really understood all about lathes.

German apprentices are offered more than 300 occupations. Yet, about half of the apprentices change occupations after finishing the program and have no difficulties in adapting to the new ones. Germans are confident that their training prepares apprentices to change occupations, as well as to perform well in the one they chose.⁶ While they are progressively consolidating families of occupations, this is not done as a response to a perception of inadequate occupational mobility.

Against the belief of many Western observers, there are good data showing that Russian vocational school graduates are increasingly changing occupations and are not worse off for that.⁷ The 800 occupations do not produce graduates incapable of adapting to other trades. This is because these youth take ten years of serious schooling before joining vocational

⁶ See for instance a paper by Dr. Manfred Leve, Training and the labour market (Maastricht, MISEP Meeting, European Centre for Work and Society, 1986). The author is the Director General of the Bundesanstalt für Arbeit (Nuremberg) which is the research branch of the Ministry of Labor.

⁷ Castro, Claudio M. Tradition and disruption in Russian vocational education. World Bank, 1994. chap. III.

schools, where they receive a relatively broad technological background. Only in their last year they really specialize in one trade.

Research done several years ago showed that the graduates of Senai had clear cut and specialized diplomas. Yet, they changed occupations more often than workers in the same workshops who had several additional years of academic education and no formal vocational training. In addition, they did not earn any less by having new occupations. In other words, those who were locked in occupations were the ones who received the preparation claimed to be the most general, namely secondary schools.⁸

7. Private schools and private funding? How far can we go?

Whenever public money is involved, there are good reasons to ask whether there are better ways of providing this service, whether it can be done by the private sector and whether cost recovery is justified. As much as all these concerns are justified, this section contends that pragmatic considerations have to prevail over general principles.

Who will pay the bill?

All parties concerned may agree that a given training is important and productive. Yet, there may be disagreement on who will pay the bill. Should the enterprises pay, since they are the ones who benefit more directly from the enhanced productivity? Should the trainees themselves pay, given that this training is ultimately something that belongs to them and will bring them tangible benefits? Should the government pay, since it is in the interest of society at large?

The current literature on human capital is far from reticent on this matter.⁹ The neo-classical advice is that trainees should pay for their training, if it is of a general nature, enterprises should pay if it is "firm-specific" and the government if there are externalities or serious market imperfections. Notice, however, that neo-classical economists are reluctant to recognize externalities in training,¹⁰ (an issue already discussed) and for that reason do not see much of a need for public funding of training.

In any case, economic agents do not always behave according to what economists prescribe. And often there is not much that can be done to change their behavior. Observation seems to indicate some common patterns.

Predominantly middle class students attend vocational training programs preparing for white collar occupations. Typically, these students — or their families — can afford these relatively short and inexpensive courses. Cost recovery from students is a good policy on equity and efficiency grounds. There are good reasons to charge students, as long as there are some provisions for the less affluent to get scholarships or attend other tuition-free insti-

⁸ Castro, Claudio M. & Mello e Souza, A. *Mão-de-obra industrial no Brasil*. Rio de Janeiro, Ipea, 1974. cap. 5.

⁹ Friedman, M. The role of government in education. In Solow, R. (ed.). *Economics and the public interest*. Rutgers University Press, 1955. The World Bank Policy Paper (op. cit.) also follows this line.

¹⁰ See, for instance, Blaug, Marc. *Where are we now in the economics of education?* Paris, ECD, 1982; and also this same position echoed in the World Bank Policy Paper, op. cit.

tutions. But even better, this is an area that in many countries is dominated by proprietary schools.

By contrast, working class youth typically enroll in training for blue collar occupations. These are long and expensive courses, way beyond the financial reach of these students, even if they were offered loans. In theory, enterprises should pay for this training, but they refuse to do it voluntarily, on the grounds that they may lose their investment if the graduates leave the enterprise. Hence, the public sector has to pay, lest the supply may be very meager. These are very controversial issues, where many economists keep repeating standard prescriptions and ignoring the real world conditions.

While in theory the government does not necessarily have to deliver directly these courses, there are few examples of privately operated courses funded from public sources. The Brazilian Senai and Senac, which are financed out of a tax on the payroll, are the only major exceptions to this rule, anywhere in the world (while most Latin American countries copied the Senai model, this major feature was left out).

Countries like France and Chile allow firms to use part of the tax on training to prepare their own workers — directly or by hiring licensed operators. This is a good solution, but always very limited. To avoid fraud, elaborate control systems are usually imposed, scaring away small enterprises who cannot afford the costs and trouble of preparing the paperwork.

In the end, the training that is needed to prepare a flexible workforce for the modern manufacturing sector cannot be mainly funded from private sources, either by students themselves or by enterprises. If the government does not support it, as do just about all industrialized countries, it will be handicapped by an improvised workforce. The closest case to that is the United Kingdom, which may have gone too far in transferring the burden of training to the private sector. As a result, it trains less than France and Germany and it also has a lower labor productivity than these countries.¹¹

Can the private training sector develop without a solid public system?

Another common prescription from economists of neo-classical orientation is the idea that the private training sector should be developed and eventually replace the public, with the well-known benefits of the increased efficiency of private management. This prescription may lead to policies to reinforce the private sector and trim down the public.

Like other similar policies presented before, this one makes considerable sense, if managed wisely. There are no doubts that private trainers tend to operate with lower costs and are more alert to changes in demand. Yet, dismantling the public sector is not the way to support the private sector, since the fate of the private sector is linked to that of the public sector.

In fact, it has been observed that countries with large and solid private training also have big and expensive public training. This does not seem to be a coincidence. The private system can be more effective than the public in the delivery of training. But it cannot afford to train instructors and prepare high quality training materials. It rides on the existing traditions and experience of the public sector. Behind the strong private training system of the United States is an equally strong public training. The same can be said of France.

¹¹ See, for instance, Training for work: in search of the missing links. *The Economist*, Dec. 1986. pp. 99-107; and Atkinson, Ken. Developing youth training services. *Industrial and Commercial Training*, Nov./Dec. 1985.

M. Lukovsky in his doctoral dissertation about training in São Paulo compared the training offered by Senai and that offered by private operators in the same geographical area. He found little if any difference in the effectiveness of the training offered by these different institutions. However, what he did not mention in his paper but admitted in a personal conversation is that all the private trainers were former Senai instructors and all the teaching methods and materials were taken from Senai. In other words, the only reason they could be as good as Senai was the fact that they were clones of Senai. There is nothing wrong with that, as long as we understand that good quality clones require a competent operator to be cloned.

8. How do we decide whether training is good or bad?

In a world of scarce resources, training expenditures have to compete with others, both at the level of public budgets and inside enterprises. One way or another, it is necessary to decide how much training will be offered.

As could be inferred from the above arguments, the decisions have to consider a number of factors. There is a more obvious level in which costs and immediate results have to be compared, in order to decide if the benefits justify the costs. However, there is more than that and, in some cases, other objectives that are less clear in the short run will have to be considered. This section will examine briefly these situation.

Do the results justify the costs?

In most cases, costs are quite easy to understand and assess. The major *caveat* refers to situations in which there are differences between social costs and those borne by different actors. Tuition-free education is only free for those who receive it free of charge. Someone has to pay for it. By the same token, the heavy outlays in equipment, building and land do not appear in the cash flows and budgets of schools. Nevertheless, they mobilize resources of society that could have been used for something else. As long as we understand these cases and treat them as appropriate, the difficulties with costs are minor.

The problems are on the side of the benefits. As suggested before, when training is just another manner of conveying skills that are widely known in society, we can take the income differentials of those who took the course, as compared to those who did not, as a measure of the results of training. Needless to say, this is only valid if the labor markets are sufficiently competitive. That being the case, it is a simple matter to compare costs and benefits. More sophisticated analysts would want to compute internal rates of return, which is a more elegant and methodologically satisfactory way of comparing costs and benefits.

Rates of return allow comparisons of different investment alternatives, and even comparisons of investment in education or training with investments in physical capital, if one believes some of the simplifying assumptions which are required for such wide jumps of imagination.

But even more crude measurements can give some indication of benefits of investment in training. Any examination of training programs can gain from having a clear idea of costs and, at least, some data on the earnings of those who took the courses, compared with those who did not.

But aside from these financial analysis, one may first want to find out what happened to the graduates. Did they get jobs? Did they get jobs in which they can use the skills they learned? If they are doing something that does not correspond directly to their diplomas, is it something in which the training could be of benefit? No rates of return need to be estimated to cast doubts on programs where the graduates cannot find jobs or if they end up in occupations in which the training could not possibly be of any help.

And in fact, a significant proportion of the training that is being offered in many countries would not pass these simple tests. Either the quality is too poor to compete with on-the-job learning or there are no markets for the graduates.

While this paper may sound as an outright advocacy of training, this is not so. It is an advocacy of high quality and serious training that is fine-tuned to clear needs of the economy. Bad training abounds and constitutes a most unwelcome form of waste.

But going back to problems of measurement, rates of return only measure one among several consequences of training. As much as it makes little sense to ignore cost-benefits aspects, looking only at such numbers is equally inadequate. As suggested previously, there are other consequences of training which cannot be ignored. In addition, in some cases, these immediate measurements leave aside consequences that can be even more important. Worse, there are many situations in which even at the conceptual level the results of training are confusing or indeterminate.

Can we always measure the results of training?

The possible externalities of training have been mentioned before. Indeed, there are clear situations in which the earnings of those immediately affected by training do not capture some of its most critical consequences. When OECD countries state in their public documents that their main reasons for putting much stress on training is the creation of a technological culture, they are just saying that.¹² In the long run, what matters most in training are results which are not captured by income differentials.

But there are also other situations in which the results are confounded and where we cannot impute the observed results to this or that factor. This is particularly the case with the new generation of in-service training programs. Most modern corporations offer training simultaneously with many other changes in the productive process. In fact, training is just one component of a broader strategy to increase productivity. At the same time, new machines are installed, new forms of work organizations implemented and workers are retrained to operate in this new environment. The firm expects substantial increases in productivity, yet, there is no way to find out what would have been the independent impact of any individual part of this change package (in addition to the even more intractable problem of positive interactions between these factors).

Furthermore, modern corporations are decentralizing training decisions to the shop floor management. These supervisors train their workers and contract out other parts of training at the same time that everything else is changing. Any hope of basing training decisions on well-measured indicators is futile. If anything, the results of training are becoming

¹² ILO. Réunion tripartite européenne sur les repercussions des mutations technologiques sur le travail et la formation. Geneva, ILO, 1991. pp. 61 *et passim*.

more difficult to identify. Managers evaluate the added value of the entire package, rather than trying in vain to disentangle its parts.

To sum up, if it is feasible to have a clear idea of the results of training, by all means, this is a good idea, particularly in the case of large pre-service training programs run by public or semi-public institutions. However, it must be understood that not all training can have its consequences measured.

Is there anything in common between embroidery classes and computer repair training?

No analyst of education would want to lump together the results of primary schools and those of a doctorate in plasma physics. Yet, there is a tendency to refer to the results of vocational training as if this were a homogeneous entity. Some say that in country "X" vocational education is ineffective or unproductive, as if courses teaching basket weaving had something in common with courses that instruct workers on the maintenance of robots.

These statements are meaningless. The market for basket weaving may be starving for well-trained workers and that for robot repairmen completely saturated. Or vice-versa.

In contrast to education, the markets for training are quite segmented by specialty, skills level of the graduates and location. Averages may be quite useless to represent the distribution of results. The fact that graduates of a weak technical school in mechanics cannot get jobs has little to do with excellent results for another vocational course in mechanics which offers good quality training.

Some training requires a high degree of specialization and depth. The mechanic responsible for fixing a computer-controlled milling machine has to know much about that machine before he even gets close to it. An office worker needs a broad range of rather non-specific skills, in combinations which are relatively flexible. He can easily learn on the job.

Some courses prepare in a relatively short time for occupations that are simple and repetitive (such as seamstresses or loom operators). They can be offered in schools or on the job. They merely replicate existing skills. The criteria to decide are costs and results.

Other courses are long and expensive. Most enterprises do not have the experience or the technical means to teach them properly. Typically, this is the case of the maintenance occupations that are required in just about any factory. The impact of poor maintenance is devastating but, usually, improvements are not reflected on the salaries of more competent maintenance workers.

In conditions of very high growth, all graduates are hired. In deep crisis, none get jobs. But in between these uncommon situations, average results do not lead to useful policies.

A recent survey of graduates of vocational schools in Stavropol (Russia) indicated that 95 percent of the technicians in the printing trades graduate with a guaranteed job. By contrast, 10 percent of the health personnel have these contracts.¹³ On the average, half get jobs. What does this average tell us? Clearly, a policy based on such averages would conclude that training is a mediocre investment. Yet, an analysis that went beyond averages would suggest that training in the printing trade is a good investment while health training is not. The policy implication is that this system needs a mechanism to get rid of the training offered in saturated markets and incentives to expand it in the areas where employment is easy.

¹³ Castro, Claudio M. Tradition..., op. cit., chap. III.

To sum up, averages are not good guides to policies in the area of training. Given the high degree segmentation of the markets, chances are that results are considerably different among these markets. Any generalizations have to be far more cautious than in education.

9. How do we deal with training at the end of this century?

This paper tried to show that training has had its ups and downs in the minds and pockets of people and governments. Cherished then despised, prodigiously then avariciously supplied, a matter for educators and then hunted by economists trying to avoid waste.

At present, we are not finished with the business of putting the breaks on the indiscriminate supply of training, regardless of its effective utilization. Many countries still train because they feel sorry for the poor, because they did it in the past and inertia prevents changing course or because they wrongly believe it will create jobs.

Economists took the lead and propose that “no demand, no training”. But using the metaphor of the pendulum, there is a risk of going too far in the opposite direction. And indeed, this seems to be happening. Training becomes a black box. What is inside it does not matter. We just check how much it costs and what comes out in the other end.

It is my contention that we need to understand the process, we need to open the black box and peek inside, if nothing else, because we do not know how to measure very well its outcomes and we risk missing some of its most important consequences because it is not well captured by numbers.

In fact, some of the most important effects of training are the long run creation of a competent and adaptable work force, capable of dealing with changing technologies and displaying the proper attitudes. Ultimately, the quality of training goes much beyond the wage differentials of its graduates. Training is a conduit for the transfer of technologies. Attitudes and motivations are just as important.

Ultimately, we have to live with the inevitable predicament of the social sciences: elegant theories have to share the stage with careful and qualitative analysis of the real world. Our challenge is to juggle at the same time with rates of return and with the way students sharpen their chisels.