For over a decade now, we have been battered again and again by a seemingly endless succession of inescapable problems and crises which has shattered our former complacency and our faith in an orderly civilized world and in the attainment of a full life for all the world's people. Among the problems which threaten to overwhelm the international order are the population explosion, the pollution and degradation of our environment, famine, civil strife and terror, proliferation of nuclear weapons, youth disaffection, energy shortages, inflation, the apparent failure of democratic leadership and of international institutions... Long indeed is the list of our woes!

Is there hope for mankind?

Only two decades ago, we all would have answered with a ringing affirmation of mankind's positive destiny. After all, faith in the essential goodness of man and the efficacy of progress had been a fundamental tenet of our culture for many generations. Yes, there are problems, we would have readily acknowledged, but we can solve them all in time through education, research, technology, legal and social reform, planning, organized institutional action, and the eventual attainment of international goodwill and understanding.

For centuries, it seems, ever since the onset of the industrial revolution, the concept of progress had been the guiding principle of Western civilization. By the very nature of human history, we thought, every generation must somehow improve upon the preceding one. Almost by definition, history is a journey of progress, in the course of which mankind rises higher, qualitatively as well as quantitatively.

Now, suddenly, we are not so sure. A host of crises negates our hopes. We are plunged into a malaise, an anxiety, an uneasiness. It seems that our journey has taken us to some fateful boundary, beyond which lies uncharted and dangerous ground, a hostile terra incognita. Few of us can muster the optimism to look on today's crisis as a temporary setback, a momentary pause in our headlong voyage, merely a waystation in which we might gather new energy in our continuing quest to attain ever greater heights and view wider horizons.

The pessimists who seem to dominate the intellectual community predict the decline of our civilization, and, as was the fate of Rome, expect us to be plunged into another dark age. Before our very eyes, they have transformed the prevailing perception of history from a bright promise to an unavoidable disas-
COMMENTARY

by Daniel Hillel

ter. “We’ve seen the best of the game,” said novelist C.P. Snow, while historian Arnold Toynbee predicted that the developed countries will soon find themselves in a state of permanent siege, in which even the material conditions of life will become increasingly austere.

In the face of this profoundly pessimistic perception of reality, the first victim is likely to be the moral and spiritual equilibrium of our society. In times of stress and adversity, some relatively prosperous individuals or nations, feeling threatened, may be tempted to seek advantage by setting themselves apart and aloof from the remainder of mankind. There are plenty of smug and self-righteous ways by which to rationalize such an attitude. I have recently heard a presumably serious academician, speaking before a large audience in a major university, make the startling statement: “if those people, obviously referring to those developing countries, “insist on producing endless... continue reading...
Now, one generation later, the population of Israel is almost five times as great, and its agriculture is now producing, either directly or indirectly (i.e. by exporting and earning), the entire food requirements of this vastly greater population. In other words, agricultural production in this one country has been multiplied tenfold within less than 30 years. This is indeed a remarkable achievement.

To be sure, it was not an easy task. It would not have been so easy even if the country did not have to contend simultaneously with a multitude of other problems with competing demands upon its manpower and other resources. Nor were the physical conditions particularly favourable. Perched between sea and desert, the country is subject to shifting climatic patterns with a high incidence of drought. Moreover, the land had been ravaged by erosion for centuries as the once-terraced hillsides had been overgrazed. It has been estimated that a mantle of soil one yard deep has been washed into the sea by the resulting accelerated erosion. In fact, only about 25 percent of the country's approximately two million hectares are in any way arable, the remaining soils being either too shallow, too steep, too stony, too saline, or too parched to permit cultivation. Yet the job was done, and that is sufficient proof that it can be done elsewhere, though perhaps not in the same manner or to the same degree.

But how was it done? The answer may seem deceptively simple: through trial and error (and at times it seemed there were more errors than trials), search and re-search, in a persistent, and still continuing, quest for better ways. Methods had to be devised to cultivate each soil type specifically, including loose sands and ill-drained clays, and to determine which crops and cropping sequences are optimal. After exploring every possible source of water, the country was able to utilize more than 90 percent of its renewable water supplies, including streams, springs, underground aquifers, and lakes. One of the first laws passed by the new state was a comprehensive water law, strictly regulating the pumping of water from each well so as to prevent the progressive lowering of the water table along the coast and the resulting hazard of seawater intrusion.

With water so precious, a painstaking effort had to be invested into increasing water use efficiency in irrigation. The age-old practice of flooding over the land or impounding water in furrows was quickly abandoned in favor of more highly controlled methods of application such as sprinkling. Ultimately, an ingeniously simple method was devised, called trickle irrigation, by which water is provided to crops (including large trees) drop-by-drop, in the manner of spoon-feeding babies, at a precisely measured rate to answer the climatologically-imposed demand and to prevent salinization while maintaining a nearly optimal condition of soil moisture continuously. Fertilization techniques had to be tested for each crop and soil, including the technique of injecting the nutrients into the water supply. Improved strains of animals and plants were imported whenever suitable, or bred locally. Methods of weed and pest control specific to the country's conditions were developed, with due attention to the hazard of environmental damage. Other innovations related to climate control (e.g. the use of plastic covers and greenhouse culture) as well as to harvesting and storing produce. Nothing, in fact, could be overlooked.

In the course of its agricultural development, Israel was aided greatly by the extraordinary diligence and ambition of its new farmers — men and women who had no background in farming and hence, unbound by traditional methods, were ever willing to try new ways. In many cases, these self-educated farmers, particularly on the collective farms, conducted their own research and forged ahead of the scientists in finding new and better ways.

Israel's achievement can be duplicated, and even surpassed. A case in point is the agriculture of the Arab sector of Palestine, which, taking advantage of the Israeli experience, advanced even faster to close what seemed like a gap of centuries within a single decade. Other countries have made equally remarkable progress. An outstanding example is Japan, which, although located in the very northern fringe of the rice growing belt, and would therefore be considered a priori to be marginal, actually produces an average rice yield five times greater than that of Bangladesh where conditions of soil and climate are nearly optimal for rice. Bangladesh itself, once it solves its internal problems and organizes for action, can undoubtedly surpass the Japanese achievement. I have had some pertinent experience in Burma, among other places, where grain yield of six or more tons to the hectare were shown to be possible in a region where only shifting cultivation had been practiced, yielding no more than a tenth of the potential. There is, of course, a significant mutually causative correlation between a country's productivity and its educational level, notwithstanding the abundance or paucity of natural resources. Some of the most richly endowed countries are among the poorest, and vice versa.

The crucial problem of increasing food production lies not in the Malthusian realm (namely, the existence of an inherent limitation on the rate of production increase), nor in the neo-Malthusian realm (limited resources), but in the human realm. Here, again, it is not in the population growth per se (though excessive population growth can certainly exacerbate the problem — that much is obvious), but, ultimately, in the ability of each nation to muster its collective will and mobilize its resources to carry out an effective program of agricultural and general economic development, as well as in the ability of the entire family of nations to cooperate in this common goal. We come finally to the most important question: is the international community ready to stop squandering the most precious of all resources — human effort — in the futile and vainglorious pursuit of military power, and begin applying to education, population control, agricultural and economic development that which is now wasted on the means of war? It seems totally incredible that the total global annual investment in agricultural research and development amounts to less than one percent of the total spent on armament.

As an agricultural and environmental scientist, I am convinced that we have the essential knowledge and capability to fructify barren lands and feed all of humanity even allowing for the inevitable portion of expectable population growth. Yet not enough is done at present, and not enough will be done until a new spirit of collaboration rather than strife begins to pervade this global village. It is here that my basic optimism occasionally falters. Perhaps we are destined to witness and suffer harder times before the necessary attitude evolves and the necessary action is taken. Perhaps the new approach will arise only out of even more dire adversity. But it will, as it must.

When the problems loom too formidable to solve in our own lifetime, I am reminded of the ancient adage: "It is not for you alone to complete the task, but neither are you free to evade it."