



Goodshoot

Sunrise in the Himalayas, in Nepal. After benefiting from the photosynthetic oxidation of water and enduring climate variations from the time of their emergence on Earth, humans are only just beginning to exert a significant influence on the greenhouse effect that determines the proportion of solar energy their planet retains to "keep warm."

III. THE SUN AND EARTH DENIZENS

Of the many ways in which the Sun makes its influence felt on the life of Earth denizens, some of which - for example, through magnetic repercussions in the upper atmosphere - are only mentioned in passing in this issue, the heat and light it dispenses are the most apparent. An influence of which Earth dwellers perceive the essentially beneficial character, on the scale at any rate of the few billion years during which our star will slowly burn up its reserves. Which does not prevent them from feeling concerned, as regards the near future, as to excessive climate warming, attributable to the uncontrolled release of greenhouse-effect gases into their atmosphere. To evaluate the consequences of this phenomenon, of which humans themselves have helped accelerate the evolution, knowledge of the ensemble of factors that acted on climate in the past is decisive. This allows better predictions to be made as to which values atmospheric concentration of carbon dioxide will be moving to. This is but one of the fields in which CEA research workers, capitalizing on the expertise gained in and for the nuclear sector - isotope tagging being just one example out of many - have achieved significant results, of which some are presented or referred to in this third chapter.

As regards virtually direct use of solar radiation, this is the case, in particular, for the developments aimed at rolling back, as far as feasible, the technological limits of photovoltaic energy, a goal set in the context of a proactive development drive concerning renewable energies as a whole. The work of CEA in this area will be covered more extensively in a forthcoming issue of *Clefs CEA*, to be devoted to the New Energy Technologies.

Among uses of solar energy showing no less promise, photosynthesis is targeted by the organization's teams in an effort to unravel its mechanisms, with the aim, should it prove achievable, to domesticate this essential process, which made possible production of oxygen into the atmosphere and the emergence of new life forms. For what purposes? For instance, in order to generate hydrogen directly from solar energy and water, or to assist in decontamination of heavy-metal charged soils, by means of photoremediation. All of which research efforts involve an interdisciplinarity that is no empty slogan: biologists, chemists, geneticists and physicists all come together to pool their visions of the matters at hand. Finally, the major remit, for CEA, of understanding and controlling the effects on humans and their environment of radiation, especially ionizing radiation, have led research workers to contribute actively to the advancement of knowledge of the effects of solar radiation. Both as regards its beneficial effects, which is the case as a rule, when ultraviolet radiation, in particular, assists in vitamin synthesis, and when it becomes deleterious, as when too intensive exposure, or genetic deficiencies, result in the cellular machinery getting out of order, or its natural capacities for self-repair being overwhelmed.