

Acknowledgements

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INSTITUTE NEWS

Forestry's fantastic future

Browsing through an old National Geographic magazine I came across the lead article of the issue for September 1958 – "You and The Obedient Atom". The 51-page article began: "Abundant energy released from the hearts of atoms promises a vastly different and better tomorrow for all mankind."

As well as electric power, the article was confident about ships being nuclear powered. The Chief of US Naval Operations was quoted as saying: "Perhaps 10 to 15 years from now we will see several hundred ships with nuclear power". Aircraft propulsion, although difficult, was seen as a real possibility.

Most of the article was on the possibilities for fission energy – "a pound of fissionable material contains as much energy as 1500 tons of coal or 250,000 gallons of diesel oil". However, in 1958 the cost of nuclear-generated energy was still considerably higher than that from other sources. Fusion (deuterium – helium) knowledge was then very limited but its promise vast – "the enormous energy thus released may some day provide man with unlimited power".

The article also discussed the prospects for isotopes and for irradiation.

With the advantage of over 30 years of hindsight the benefits of isotopes in medicine, industry and research have lived up to their earlier expectations. The 1958 article was also realistic about the risks and the problems of nuclear waste disposal. However, the vision of cheap and unlimited energy from nuclear sources seems further away than ever.

Energy is now so essential to the world. Given unlimited, cheap and non-polluting energy most of the world's problems could be solved – except possibly those of politics and religion. One day there may be a breakthrough with nuclear or some alternative energy source, but this seems increasingly unlikely.

For the foreseeable future we are limited to the sun, the moon and the earth as the only reliable sources of future energy.

The earth's main contribution is geothermal. Currently this provides very little of our energy and although new ways might be developed to tap the heat of the earth's core that day still seems a long way off.

The moon's major contribution comes from the tides. But to date tidal forces have not proved anywhere near so successful as was once promised. Even if tidal generation is a possibility there are few sites where tidal power can be harnessed.

The sun therefore looks like the only possibility for providing 90 per cent, or more, of the world's energy needs. The sun will continue as it is now for about another five billion years. Currently the sun's major contribution is via fossil fuels – oil, gas and coal – all convenient and easily transportable forms.

The sun also manifests itself as an energy source in:

- hydro
- wind
- wood
- or some direct conversion process like photo-electric cells or chemical changing.

Fossil fuels will become increasingly economically limited. Perhaps even more important, the world is becoming increasingly concerned about releasing all that fossil carbon back into the atmosphere and so adding to the greenhouse effect.

Although hydro generation is an excellent energy source (and the promise of practical super conductivity could significantly improve efficiency in distribution and use) there are major limitations as to how many more dams the world can construct.

Wind power has some uses and we will undoubtedly see further developments.

From the President

It is, however, doubtful if it will be realistic to have windmill generation everywhere. It also seems unlikely that our coastlines will be lined with wave generation plants. Since wind is always variable energy storage is always going to be a major cost. Wind power's future is likely as a topping up energy source.

Direct energy conversion by photo-electric cells or some chemical process has often been heralded as a possibility. However, to date no process looks like being very cost effective on a large scale. High capital costs will be a major factor. The large area required for light capture must result in all kinds of environmental problems. Power storage needs must also be a major cost as energy is most likely to be required when the sun's energy is least (night time and during the winter). Direct conversion of the sun's energy is at best only a limited option.

Wood, which is really only water, carbon dioxide and sun's energy, is on fundamental grounds by far the simplest and most practical means of tapping the sun's energy. Storage presents no problem – quite the opposite – the trees continue to store the sun's energy when they are not required. There are no real pollution problems. Wood actually reduces rather than worsens the greenhouse effect. Wood is an ideal fuel. To ensure that trees can withstand the destructive forces of storms wood has a structure that gives a high strength to weight ratio. These properties, and its fibre network, make wood an ideal provider of a large number of man's requirements other than food or clothing. Although wood is totally renewable management skills are still required to maximise production (and profit) and, to produce the widest range of wood products.

Unless there is some major breakthrough on the energy front which gives the world a cheap, unlimited, non-polluting, low risk and flexible energy source then wood (and forestry) seem certain to become even more important than they have in the past.

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