

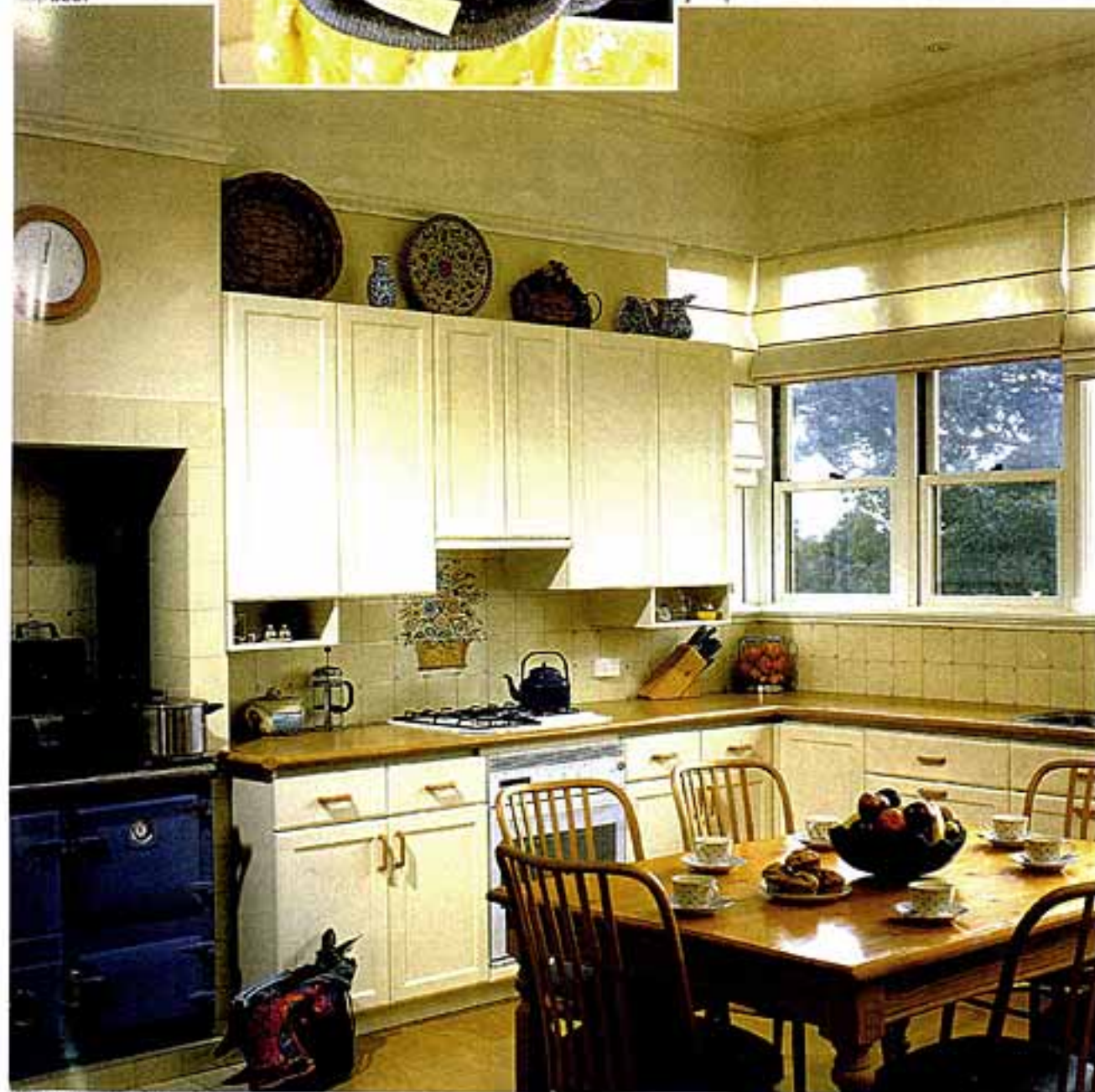
Below: A section of the light-filled and airy kitchen, facing north to catch the winter's sun through the windows running the room's width. An orphaned baby kangaroo nestled in an old overnight bag has a cosy spot by the wood stove.

Right: This is Marilyn the joey, so-called because she likes showing off her long legs in the style of a former, very famous, actress.



In either case, the main elements of energy efficient passive solar design to be included are:

- * appropriate house orientation on the block and internal room layout
- * windows positioned to capture warmth from the winter sun and provided with adequate shading in summer
- * adequate use of high thermal mass (heat absorbing) materials inside the house to lessen uncomfortably high temperature variations
- * sufficient insulation to reduce heat transfer
- * good draughtproofing and ventilation control both indoors and out
- * careful attention to the choice of trees you plant.



DANDARAGAN

One day in a summer not long gone, architect Michael Murphy received a telephone call from a farmer at Dandaragan - a district about two-hours' drive north of Perth. In Perth, it was the hottest day ever recorded. At Dandaragan, the farmer told Michael, it was 46 degrees. In his study it was 31 degrees. Achieving a drop of 15 degrees during a sustained heat wave was a remarkable achievement, entirely attributable to passive solar design.

Michael Murphy is the "Murphy" in Baverstock Murphy and Associates - long-time advocates of passive solar design. Applying this science they had designed the Dandaragan farmhouse, and anecdotal evidence they have since received matches that gathered at other residences they've planned.

The evidence clearly supports the claim that the severest effects of winter and summer can be warded off at very low cost. In all cases this has been accomplished without air-conditioning and only minimal artificial heating. Occupants enthuse about year-round comfort in light-filled, airy houses with seasonal swings of no more than about 10 degrees.

The first, most important step in passive solar design is placing your house on the block. This was hardly a challenge at Dandaragan on a property spread over thousands of hectares. But on confined blocks without appropriate north-south orientation, placing the house becomes more of a science.

Erecting homes designed to either combat or take advantage of WA's abundant sunshine requires, ideally, north and south facing walls 1.5 to 2 times the length of east and west walls. North facing windows of ample proportions are positioned to receive maximum winter sun. On the south, east and west, windows are kept to a minimum and as much shading as possible is provided to ward off heat when the sun reaches its southern summer ambit.

The Dandaragan farmhouse is positioned thus and, additionally, employs other solar design devices to maximise comfort. Principally, for summer living, these include such features as a breezeway - a south-facing passage that is opened in summer to catch late afternoon breezes, which flow over a small pool where they are cooled before being funnelled into living areas. Windows strategically placed aid this function by efficient cross ventilation.

Walls forming a sandwich of rendered brick and insulation are another principal feature, as are tiled floors everywhere except the bedrooms. The walls and tiles are what is called thermal mass - very efficient at storing warmth in winter or remaining cool in summer, particularly in shaded areas. Typical of the Australian farmhouse, there's ample shading from verandahs on the east, west and south. In winter, different principles apply. Large glazed areas take up almost all the northern facade, looking into a very large lounge, a kitchen with the best views of rolling farmland, and the master bedroom and second bedroom. The kitchen, incidentally, has the only woodburning appliance in the house. True to tradition, the farmer's wife vows that for baking or roasting, nothing beats a wood stove. Another clever contrivance of passive solar design is applied along this facade - a



Above: In summer, cool evening breezes flow along the breezeway, through louvered windows and along a gallery (foreground). Cross-ventilation moves them throughout the house where they are absorbed by thermal mass and the coolness is stored overnight.