

# touching technology

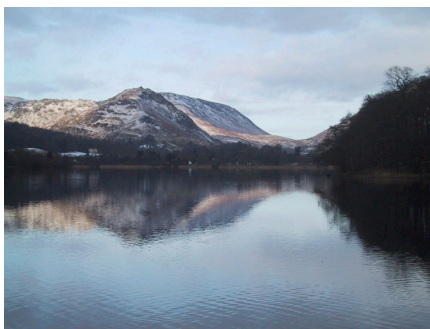
Alan Dix  
Lancaster University



[www.hcibook.com/alan/](http://www.hcibook.com/alan/)  
[www.alandix.com](http://www.alandix.com)

Athens/Tripolis March 2009

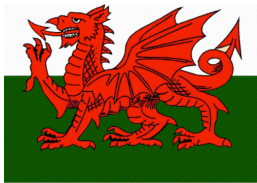
I work in Lancaster  
and live in Cumbria  
The Lake District



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... but

although I live in England  
and I speak English  
I am not English  
I am **Welsh**  
rydw i'n Cymraeg



... and have sabbatical year so

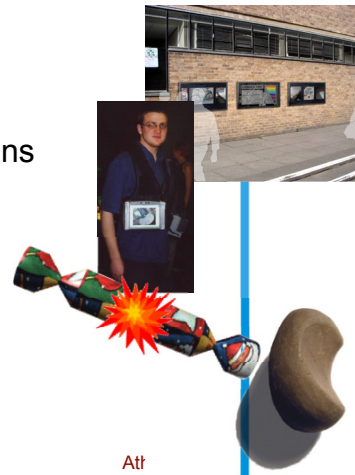
mostly in Tíree  
... when not elsewhere



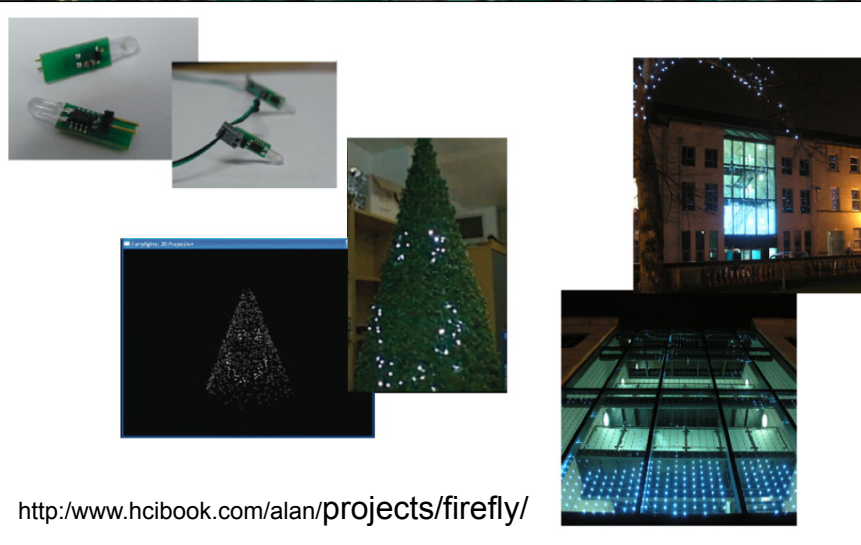
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## today I am not talking about ...

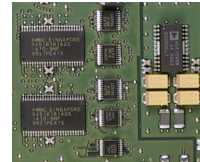
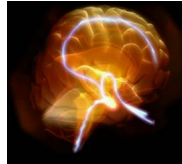
- intelligent internet interfaces  
fuzzy personal ontologies and  
structure from folksonomies
- situated displays, eCampus,  
small device – large display interactions
- visualisation and DB interfaces
- fun and games, virtual crackers,  
artistic performance, slow time
- modelling dreams and regret!!



## ... or even lots of lights



## cognition connects with computation



## when bodies touch technology

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## the physical world



material artefacts  
and design

the body  
physiology



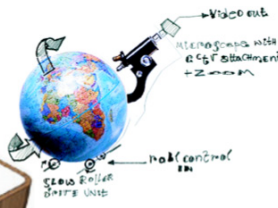
space and spatial  
arrangement



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## different ways to touch

- ubiquitous comp. — tech. entering the world
- tangible UI — embodying computation
- ... plus mobile ... — when location matters

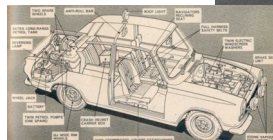


- virtual reality — emulating the world
- AR / MR — blending physical and digital worlds
- physiological comp. — the body is the interface
- product design — physical devices with digital effect

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## three rules to be broken

- directness of effort
- locality of effect
- visibility of state



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continuity  
in time and space



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## physicality and the body

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## bodily limitations – skin and bone

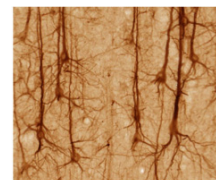
- ergonomics and health
  - keyboards and trackpads
  - car switches
- as a design resource
  - simultaneous switches in nuclear bunker
  - sweeties on the high shelf



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## bodily limitations – grey matter

- fleeting thoughts – electrical
  - Millers  $7 \pm 2$
- long-term memory – physical connections
  - some sums ...
- mood and medium term memory – chemical
  - coping with multiple chat windows



<http://en.wikipedia.org/wiki/File:Smi32neuron.jpg>

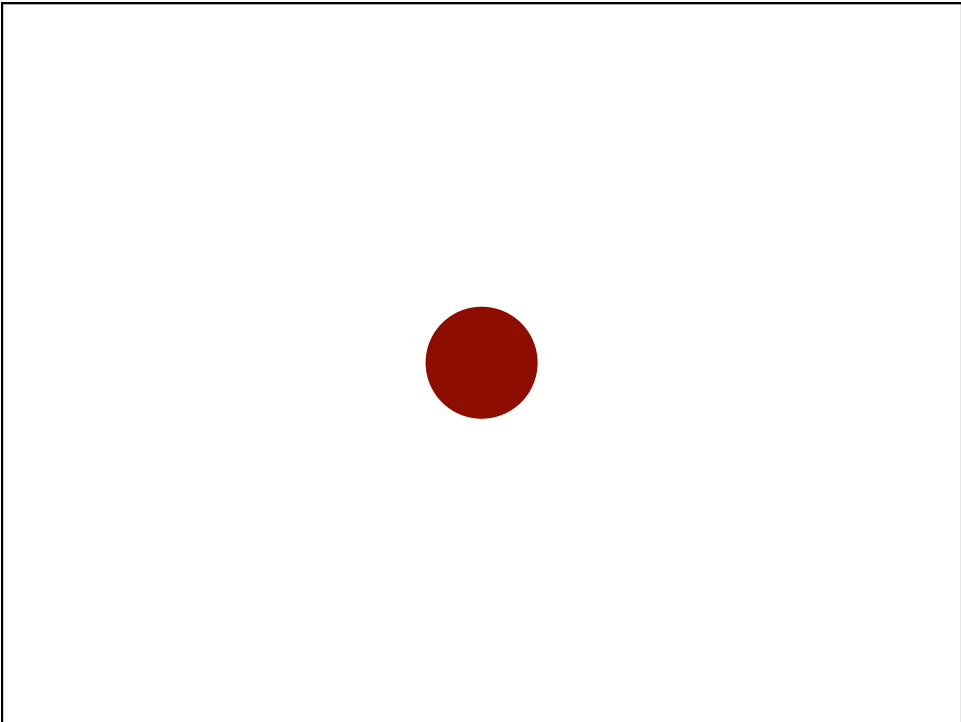
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## action in the world

- Gibson and affordances
- distributed cognition
- the embodied mind

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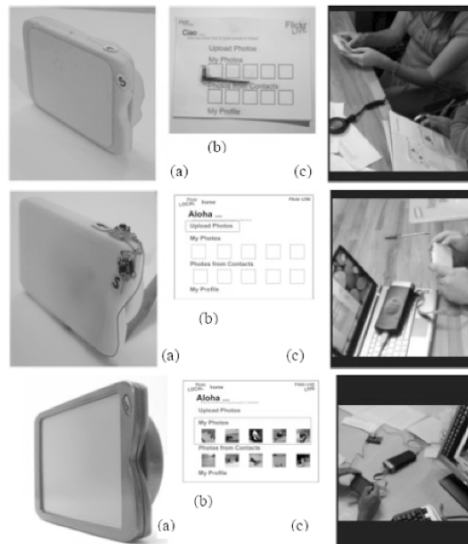
physicality and design

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A vertical dark red line is positioned on the right side of the slide, extending from the top edge to the middle of the slide's height.

## levels of fidelity in design

from paper prototype  
to working mock-up



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## study the old to design the new

work with Masitah Ghazali  
& DEPTH project

- look at ordinary consumer devices
  - washing machine, light switch, personal stereo
- why?
  - we are used to using them ourselves
  - they have been 'tested' by the marketplace
  - they embody the experience of designers



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## half empty?

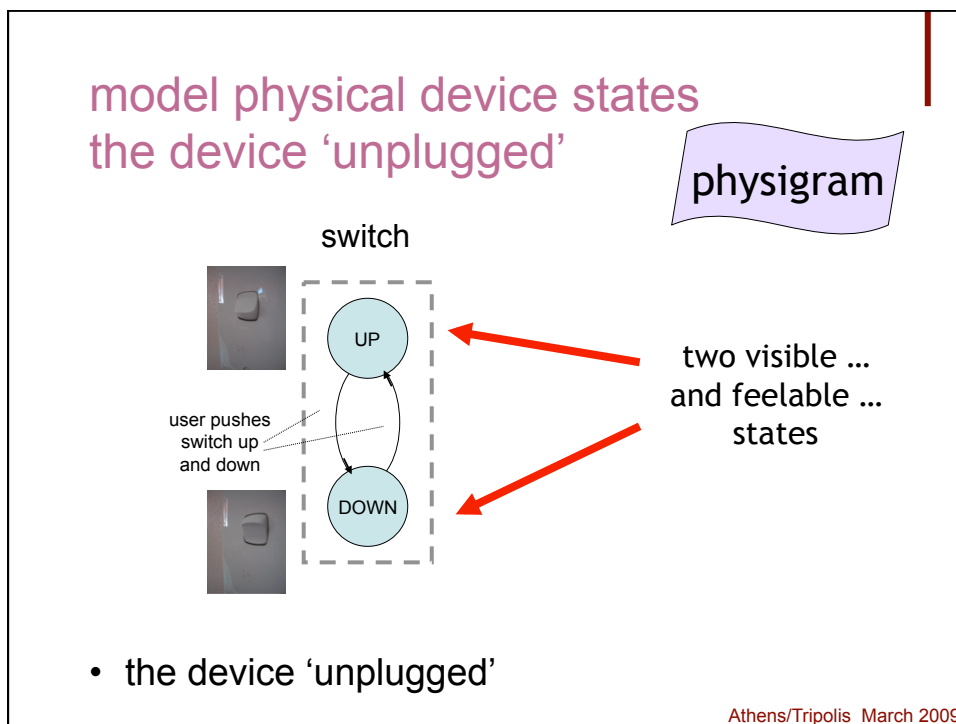
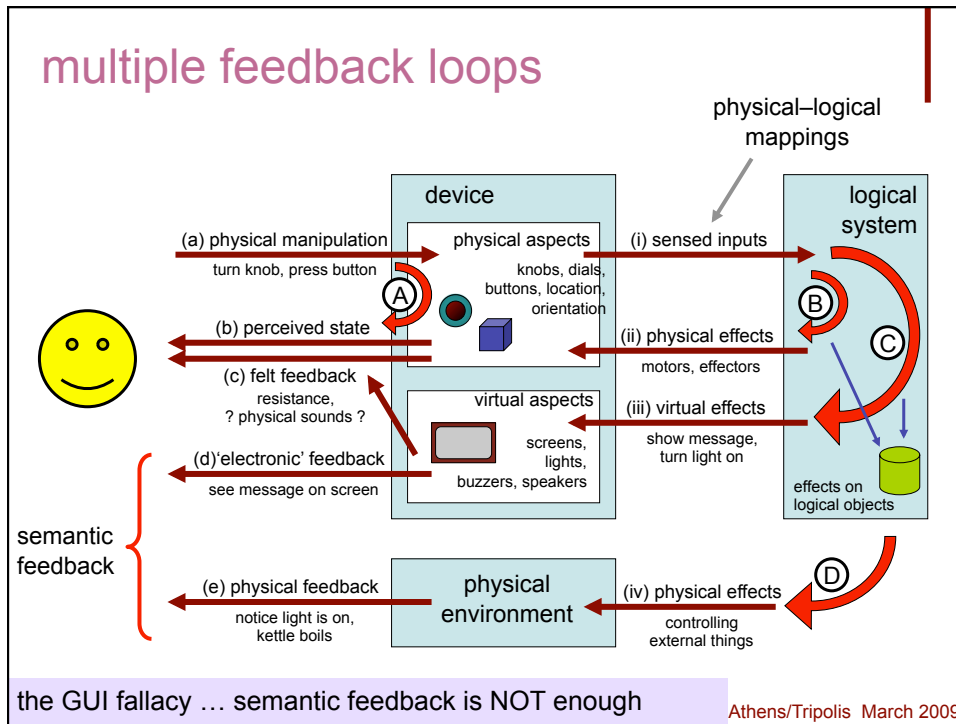
- not the first ...
  - Norman – DOET/POET
  - Thimbleby – FSM for video, microwave
- often used as HCI strawman
  - emphasise for design flaws
- we are looking for the good lessons
  - how mundane devices exploit physicality

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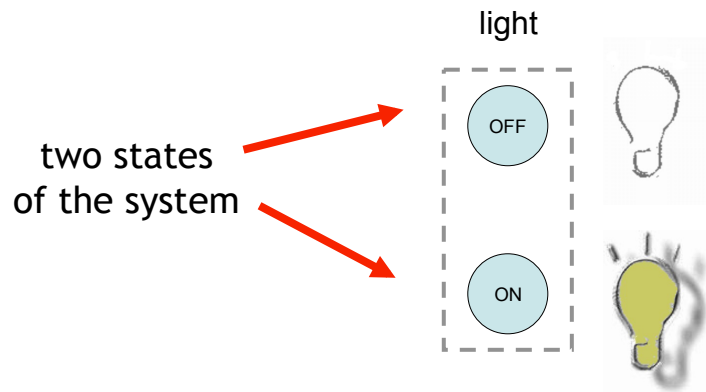
## models of AR & tangibility

- Ullmer and Ishii – MCRpd
  - architectural interaction model
- Benford et al. – sensible/sensable/desirable
  - exploring design space
- Koleva et al. – TUI framework
  - 'coherence' between the physical and digital

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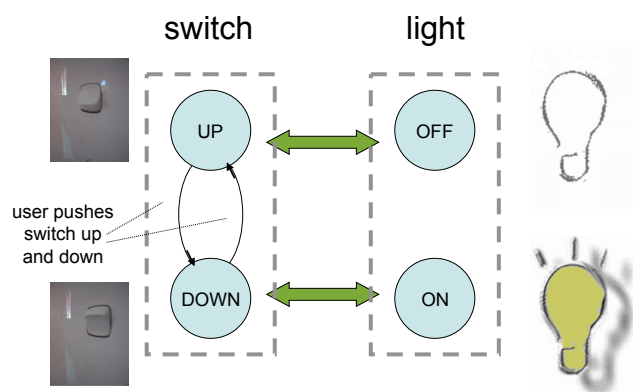


## model logical system



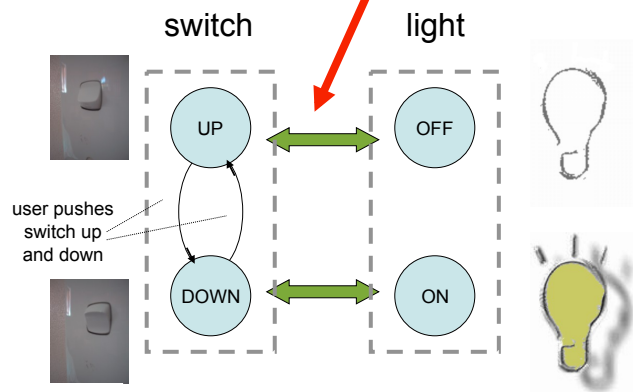
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## physical-logical mapping



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exposed state = mapping 1-1



particularly easy to understand and use  
but not always 1-1

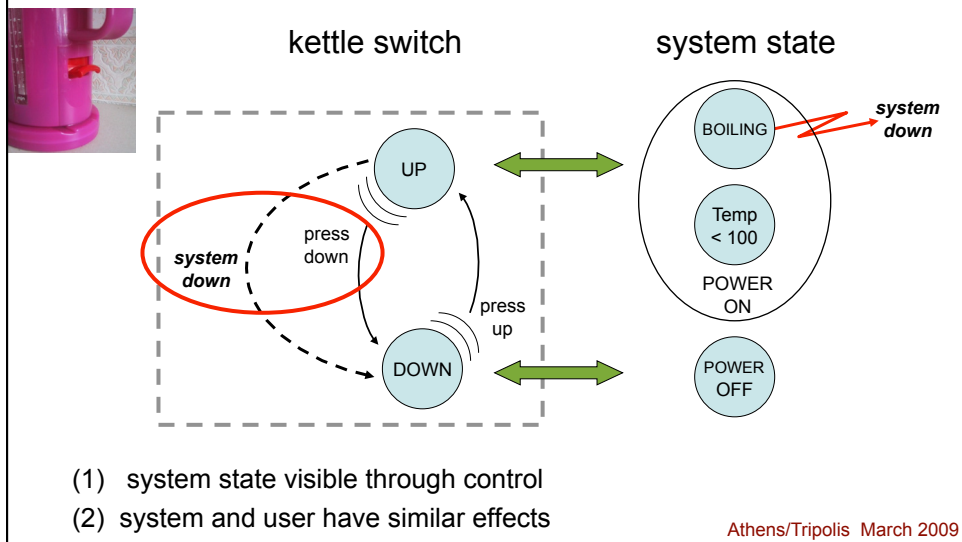
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controlled state

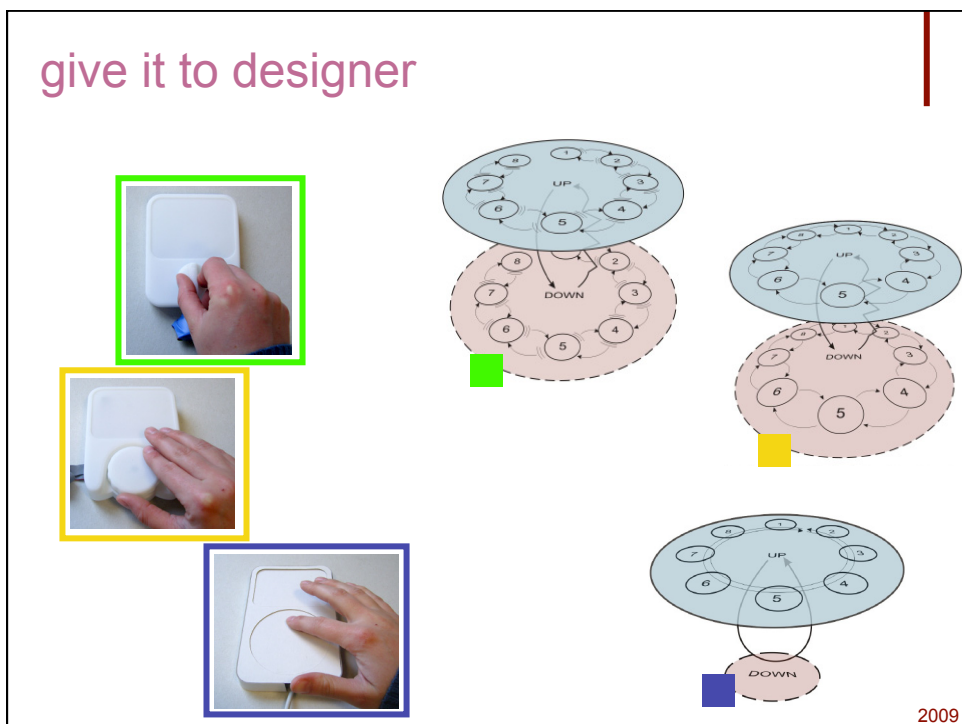


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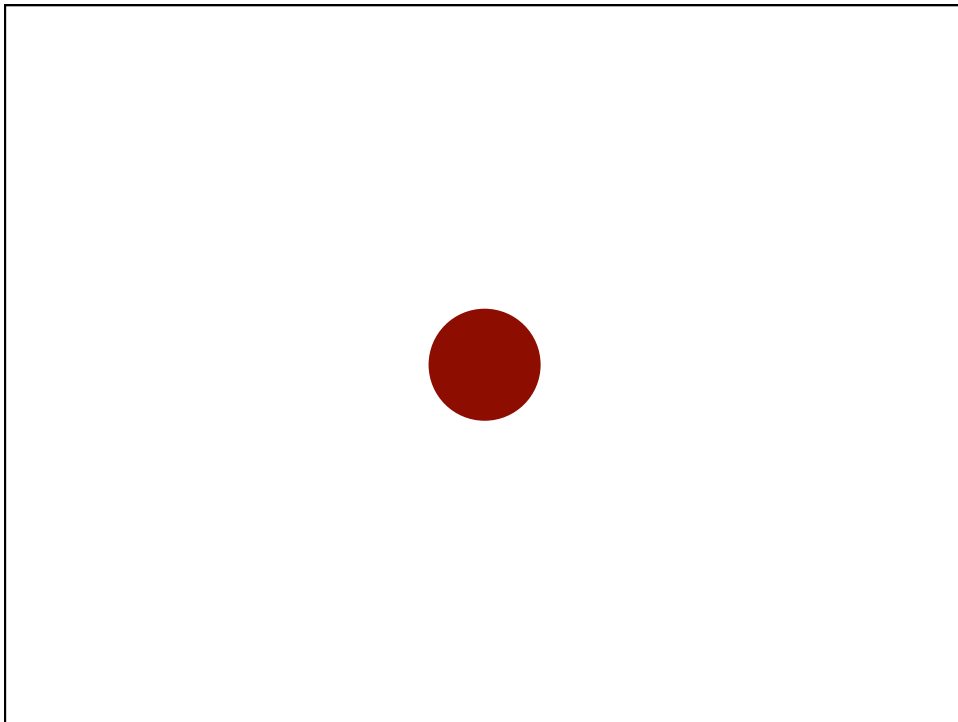
## compliant interaction



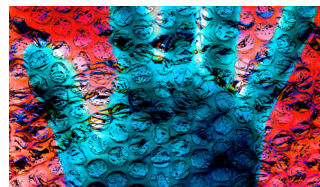
## give it to designer







- 'real' world and 'virtual world' interactions are *all physical*  
... but some are more physical than others
- understanding physicality is fascinating  
... and helps us to design better
- watch for the book ... TouchIT



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