

Yet more Welsh affairs! Using the same translation manual as §34.3 – i.e.

- ‘a’ means *Angharad*
- ‘b’ means *Bryn*
- ‘m’ means *Mrs Jones*
- ‘F’ means ... *speaks Welsh*
- ‘G’ means ... *is a girl*
- ‘L’ means ... *loves ...*
- ‘M’ means ... *is taller than ...*

and where the domain of quantification again consists of human beings – we are to translate the following into $QL^=$.

Throughout, of course, we are to use Russell’s Theory of Descriptions: so, we render a sentence of the kind ‘The *F* is *G*’ into $QL^=$ by corresponding wffs of one of the forms

$$(R) \quad \exists v((Fv \wedge \forall w(Fw \supset w = v)) \wedge Gv)$$

$$(R') \quad \exists v\forall w((Fw \equiv w = v) \wedge Gv)$$

(R) could be rebracketed as: $\exists v(Fv \wedge (\forall w(Fw \supset w = v)) \wedge Gv)$, and (R') as $\exists v(\forall w(Fw \equiv w = v) \wedge Gv)$. We give some alternative versions (with some Loglish mixes on the way!):

1. The Welsh speaker loves Mrs Jones.
 $\exists x((Fx \wedge \forall y(Fy \supset y = x)) \wedge Lxm)$
 $\exists x\forall y((Fy \equiv y = x) \wedge Lm)$
2. The girl who loves Angharad does not loves Bryn.
 $\exists x(((Gx \wedge Lxa) \wedge \forall y((Gy \wedge Lya) \supset y = x)) \wedge \neg Lxb)$
 $\exists x\forall y(((Gy \wedge Lya) \equiv y = x) \wedge \neg Lxb)$
3. Angharad loves the girl who loves Bryn.
 $\exists x(((Gx \wedge Lxb) \wedge \forall y((Gy \wedge Lyb) \supset y = x)) \wedge Lax)$
 $\exists x\forall y(((Gy \wedge Lyb) \equiv y = x) \wedge Lax)$
4. The Welsh speaker who loves Mrs Jones is either Angharad or Bryn.
 $\exists x(((Fx \wedge Lxm) \wedge \forall y((Fy \wedge Lym) \supset y = x)) \wedge \{x = a \vee x = b\})$
 $\exists x\forall y(((Fy \wedge Lym) \equiv y = x) \wedge \{x = a \vee x = b\})$
5. Someone other than the girl who loves Bryn is taller than Angharad.
 $\exists x(((Gx \wedge Lxb) \wedge \forall y((Gy \wedge Lyb) \supset y = x)) \wedge \text{Someone other than } x \text{ is taller than } a)$
 $\exists x(((Gx \wedge Lxb) \wedge \forall y((Gy \wedge Lyb) \supset y = x)) \wedge \exists z(\neg z = x \wedge Mza))$
 $\exists x\forall y(((Gy \wedge Lyb) \equiv y = x) \wedge \exists z(\neg z = x \wedge Mza))$
6. The one who loves Angharad is the one she loves.
 $\exists x((Lxa \wedge \forall y(Lya \supset y = x)) \wedge x \text{ is the one who } a \text{ loves})$
 $\exists x((Lxa \wedge \forall y(Lya \supset y = x)) \wedge \exists z((Laz \wedge \forall w(Law \supset w = z)) \wedge z = x))$
 $\exists x\forall y((Lya \equiv y = x) \wedge \exists z\forall w((Law \equiv z = w) \wedge z = x))$
7. Only if she loves him does Bryn love the girl who speaks Welsh.
 $\exists x(((Fx \wedge Gx) \wedge \forall y((Fy \wedge Gy) \supset y = x)) \wedge \text{Bryn loves } x \text{ only if } x \text{ loves Bryn})$
 $\exists x(((Fx \wedge Gx) \wedge \forall y((Fy \wedge Gy) \supset y = x)) \wedge (Lbx \supset Lxb))$
 $\exists x\forall y(((Fy \wedge Gy) \equiv y = x) \wedge (Lbx \supset Lxb))$
8. The girl other than the girl who loves Bryn is Angharad.
 $\exists x(((Gx \wedge Lxb) \wedge \forall y((Gy \wedge Lyb) \supset y = x)) \wedge \text{The girl other than } x \text{ is } a)$
 $\exists x(((Gx \wedge Lxb) \wedge \forall y((Gy \wedge Lyb) \supset y = x)) \wedge$
 $\exists z(((Gz \wedge \neg z = x) \wedge \forall w((Gw \wedge \neg w = x) \supset w = z)) \wedge z = a))$

9. The shortest Welsh speaker loves Bryn.

That is to say: the Welsh speaker who is shorter than all other Welsh speakers loves Bryn. Now consider the predicate ‘ x is a Welsh Speaker and shorter than all other Welsh speakers’, i.e. $\{Fx \wedge \forall w((Fw \wedge \neg w = x) \supset Mwx)\}$. Plugging that into the usual RTD schemas, we get

$$\begin{aligned} & \exists x(\{Fx \wedge \forall w((Fw \wedge \neg w = x) \supset Mwx)\} \\ & \quad \wedge \forall y(\{Fy \wedge \forall w((Fw \wedge \neg w = y) \supset Mwy)\} \supset y = x)) \wedge Lxb) \end{aligned}$$

or, more simply

$$\exists x \forall y(\{Fy \wedge \forall w((Fw \wedge \neg w = y) \supset Mwy)\} \equiv y = x) \wedge Lxb)$$

10. The shortest Welsh speaker loves the tallest Welsh speaker.

$$\begin{aligned} & \exists x(\{Fx \wedge \forall w((Fw \wedge \neg w = x) \supset Mwx)\} \\ & \quad \wedge \forall y(\{Fy \wedge \forall w((Fw \wedge \neg w = y) \supset Mwy)\} \supset y = x)) \wedge x \text{ loves the tallest } F) \end{aligned}$$

But similarly x loves the tallest F is

$$\begin{aligned} & \exists v(\{Fv \wedge \forall w((Fw \wedge \neg w = v) \supset Mvw)\} \\ & \quad \wedge \forall z(\{Fz \wedge \forall w((Fw \wedge \neg w = z) \supset Mzw)\} \supset z = v)) \wedge Lxv) \end{aligned}$$

Plugging the two together we get ...

$$\begin{aligned} & \exists x(\{Fx \wedge \forall w((Fw \wedge \neg w = x) \supset Mwx)\} \\ & \quad \wedge \forall y(\{Fy \wedge \forall w((Fw \wedge \neg w = y) \supset Mwy)\} \supset y = x)) \wedge \\ & \quad \exists v(\{Fv \wedge \forall w((Fw \wedge \neg w = v) \supset Mvw)\} \\ & \quad \wedge \forall z(\{Fz \wedge \forall w((Fw \wedge \neg w = z) \supset Mzw)\} \supset z = v)) \wedge Lxv) \end{aligned}$$

And we are done!