List of errors in *Types, Tableaus, and Gödel's God*, Melvin Fitting. March 3, 2003

The following errors were all pointed out by Jeffrey Kegler.

Pages 74–75 The proof of Lemma 5.10 contains an error stemming from misleading notation. In the proof I use $\tau(\gamma)$ to indicate that τ has one free variable, γ, but the notation $\tau(\gamma)$ already has a meaning—application of predicate abstraction to a term. Here is a corrected version of the proof.

Proof: For convenience say τ has one free variable, γ; the more general case is treated similarly. From now on I'll write τ as τ_γ to emphasize this. Let α and β be variables of the same type as γ, that do not occur in τ_γ (free or bound). I'll write τ_α for the result of substituting occurrences of α for free occurrences of γ in τ_γ, and similarly for τ_β. The following has a tableau proof: $(\forall\alpha)(\forall\beta)[(\alpha = \beta) \supset (\tau_\alpha = \tau_\beta)]$. The tableau proof is straightforward—an equality axiom is needed, and when one comes to instantiate the universal quantifier $(\forall\gamma)$ in that axiom, use the predicate abstract $\langle\lambda\gamma.\tau_\alpha = \tau_\gamma\rangle$. I leave the verification to you.

Now assume $\overline{v_1} = \overline{v_2}$, hence in particular, $v_1(\gamma) =_{\mathcal{I}} v_2(\gamma)$; I'll show $\mathcal{A}(v_1, \tau_\gamma) =_{\mathcal{I}} \mathcal{A}(v_2, \tau_\gamma)$. Since all members of EQ are true in $\langle\mathcal{M}, \mathcal{A}\rangle$, $(\forall\alpha)(\forall\beta)[(\alpha = \beta) \supset (\tau_\alpha = \tau_\beta)]$ is true in it, and hence $\tau_\alpha = \tau_\beta$ is true in $\langle\mathcal{M}, \mathcal{A}\rangle$ with respect to any valuation v such that $v(\alpha) =_{\mathcal{I}} v(\beta)$.

[Now the proof continues as before, starting with "Set w to be a particular valuation…", except that τ_α replaces $\tau(\alpha)$, and similarly for terms involving β and γ.

Page 99 Formula (7.20) should be

$$\mathcal{M}, \Gamma \Vdash_v \langle\lambda X.(\exists x)(X(x))\rangle(\downarrow P)$$

Page 110 In the third and fourth line from the bottom, replace "Section 6" with "Section 6 of Chapter 7."

Page 111 Insert at the end of the last paragraph of Section 1.7, "as a global assumption."

Page 113 Exercise 2.2 is incorrect—the formula cannot be proved using tableaus, and is not valid, though it is in standard models. The exercise should be moved to Page 130, and should be rephrased to ask for a tableau derivation from a Choice Axiom (Definition 9.15).

Page 120 In the proof of Proposition 9.6, formula 10 should have an $\supset$ symbol at the end of the first line.

Page 127–128 Starting with the paragraph beginning "In a sense there are two kinds of definite descriptions. . . " to the end of Proposition 9.14, replace with the following.

Like our extensional terms, a definite description may designate different things in different worlds (and also it may not designate in some, which is an added complication). Nonetheless, definite descriptions do not simply function as extensional terms. Because of the Russell-style contexual definition we are using, they function via the thing they designate—it is as if they have the $\downarrow$ operator permanently attached. This means our characterization of rigidity in Definition 9.7 is inappropriate.

Call a definite description $(\imath\alpha.\Phi)$ rigid at a world if the following is true at that world.

$$\langle\lambda\beta.\Box(\beta = (\imath\alpha.\Phi))\rangle((\imath\alpha.\Phi))$$

Informally speaking, to say this is true at a world Γ amounts to saying: $\imath\alpha.\Phi$ designates at world Γ, $\imath\alpha.\Phi$ designates at all worlds accessible from Γ, and at Γ and every world accessible from it, $\imath\alpha.\Phi$ designates the same thing. The following Proposition is an alternative characterization.

Proposition 9.14 The formula $\langle\lambda\beta.\Box(\beta = (\imath\alpha.\Phi))\rangle((\imath\alpha.\Phi))$ is equivalent in **K** to the conjunction of the following three formulas.

1. $(\exists\beta)(\forall\delta)[\langle\lambda\alpha.\Phi\rangle(\delta) \equiv (\beta = \delta)]$
2. $(\forall\beta)[\langle\lambda\alpha.\Phi\rangle(\beta) \supset \Box\langle\lambda\alpha.\Phi\rangle(\beta)]$
3. $(\forall\beta)[\Diamond\langle\lambda\alpha.\Phi\rangle(\beta) \supset \langle\lambda\alpha.\Phi\rangle(\beta)]$

Page 165 Replace the last line on the page with

$$\langle\lambda x.(\forall Y)[\mathcal{E}(Y, x) \supset \Box(\exists^{\mathsf{E}} z)Y(z)]\rangle.$$

Page 170 In Definition 11.35, replace the displayed formula with

$$\langle \lambda x.(\forall Y)[\mathcal{E}^{A}(Y, x) \supset \Box(\exists^{\mathsf{E}} z)Y(z)]\rangle.$$