Confusing conventional notation and more

*There is a wild **mess** in conventional **notation** of axiomatic set theory with letters (Latin, Greek and even Hebrew, small and capital, in various styles) and ad-hoc introduced symbols. Similar expressions may relate to completely different categories. Sometimes the same expressions are used with different meaning so that they can only be understood in local context. Some entities are just introduced metalingually without proper representation in object-language. And one should always be skeptical when 'virtual' entities come into play as it is the case in connection with classes. This mess makes it very complicated for the simple-minded reader and perhaps even hides problems. Axiomatic set-theory talks about well-ordering, but it certainly needs ORDER itself!*

Conventional publications of axiomatic set theory lack a uniform syntax. Characters are taken from Latin, Greek, Hebrew - small and capital letters, even with special fonts, special symbols and joining them without general rules, not distinguishing between individuals, functions and relations, and worse: mixing object-language and metalanguage. Principle shortcoming is the missing difference between ***scheme*** and ***function-constant***, ***formula*** and ***relation-constant*** strings (the **name** of a function or relation and their **value expressions**, often called 'terms'). Some are just given English names that refer to them, and some of these names are not even unique. Finally the reader has to know if something is a **set** or a **class** (that are not really ontological parts).

Conventional mess **Funcish** with uniform, unique and context-independent syntax

sets	$a \dots z \quad a_1\ a_2\ a_3 \dots$	***sort***	***individual-variable***	
	$A \dots Z \quad Z_1\ Z_2\ Z_3 \dots$	σ	σ1 σ2 σ3 …	
ordinals	$\alpha\ \beta\ \gamma\ \delta \dots\ \psi$	*?*	*? ? ?*	

			individual-constant	
$0 = \varnothing = \{\}$	*three possibilities*		σn	
$1 = \{\{\},\{\{\}\}\}$			σu=(′σn)	
$2 = \{\{\},\{\{\}\};\{\{\},\{\{\}\}\}\} \dots$			σb=(′(′σn)) …	
$\omega = \aleph_0$	*two possibilities*		σvnl	

		function-constant	***scheme***	*particular-notation*
$\{a\}$		(|σ)	(|σ1)	
$\{a,b\}$		(σ|σ)	(σ1|σ2)	
$\{a,\{a\}\}$		(′σ)	(′σ1)	
$\{a,b,c\}$		(σ|σ|σ)	(σ1|σ2|σ3)	
$\cup a$	*conventionally both are*	(∪σ)	(∪σ1)	
$a \cup b$	*called 'union'*	(σ∪σ)	(σ1∪σ2)	
$\cap a$	*conventionally both are*	(∩σ)	(∩σ1)	
$a \cap b$	*called 'intersection'*	σ∩σ)	(σ1∩σ2)	
a/b	*complement*	(σ1/σ2)	(σ/σ)	
$\langle a,b \rangle$	*ordered pair (oparition)*	(σ–σ)	(σ1–σ2)	
$a \times b$	*cartesian product (production)*	(σ×σ)	(σ1×σ2)	
$a^2 \quad a^3$		(σ×) (σ××)	(σ1×) (σ1××)	
$\boldsymbol{P}a$	*power set (potention)*	(⇑σ)	(⇑σ1)	

		relation-constant	***relity-formula***	
$a \subset b$		σ⊂σ	σ1⊂σ2	*particular-notation*
$a \subseteq b$		σ⊆σ	σ1⊆σ2	"
$x < y$		σ<σ	σ1<σ2	"
$xAy \quad abc$	*where A and b are **not sets***	A(σ;σ)	A(σ1;σ2)	*standard-notation*
$f{:}a \to b$		UFU(σ;σ;σ)	UFU(σ1;σ2;σ3)	"

^{a}b *set ? class of mapping sets from a to b*		UFUS(σ;σ)	UFUS(σ1;σ2)	"
transitive X	*transitivity*	TR(σ)	TR(σ1)	"
well-order X	*fundamentality*	FU(σ)	FU(σ1)	"
total-order X	*totality*	TO(σ)	TO(σ1)	"
On(X) or X∈On	*ordinality **class***	OR(σ)	OR(σ1)	"

Mencish with uniform, unique and context-independent syntax

ψ(x) φ(x)	***σ1***	***unary-formula*** *with* ***variable*** σ1
ψ(x,y) φ(x,y)	***σ1***	***binary-formula*** *with* ***variable*** *strings* σ1 σ2
*ψ(x,**y**) φ(x,**y**)*	***σ1***	***multary-formula*** *with* ***variable*** *strings* σ1 σ2 σ3 ...
weird construction:		
A(x,y)={z∈y: φ(x,z)}	σa	∀σ3[[σ3∈σa]↔[[(σ3∈σ2]∧[***σ1***]]] , ***σ1 formula*** *with* σ1 σ3

section 2.4 Interpretations *of 'Axiomatic Set Theory' ast-web.pdfby Peter Koepke , Alex Wilke, R. Knight 2006, Boris Zilber Oxford; and similar sourcesintroduce further symbol combinations, e.g. :*

collection of sentences S of sentence σ, S is a model of σ
⟨M,E⟩ *domain M , binary relation E*
⟨M,∈⟩
|— *|=*
Φ' $\Phi^{\cup}$ Φ^{Φ} Φ^{U}
*card(**R**)* *card(**N**)* ***Q***

And its getting worse.*Jürgen-Michael Glubrecht, Arnold Oberschelp, Günter Todt: Klassenlogik. On pages 449-455 they list symbols, 2 pages nonalphabetic and 5 pages relating to some sort of alphabets.*


(foto by courtesy: Parliamentary Recording Unit, Parliament of the United Kingdom 2019)

John Bercow: Order !

Johann Wolfgang von Goethe, Faust Part I, Scene IV The Study

Student *After all that, I feel as stupid*	*Mir wird von alledem so dumm,*
As if I'd a mill wheel in my head.	*Als ging, mir ein Mühlrad im Kopf herum*
Mephistopheles *Next, before all else, you'll fix*	*Nachher, vor allen andern Sachen,*
Your mind on Metaphysics!	*Müßt Ihr Euch an die Metaphysik machen!*
See that you're profoundly trained	*Da seht, daß Ihr tiefsinnig faßt,*
In what never stirs in a human brain:	*Was in des Menschen Hirn nicht paßt;*
You'll learn a splendid word	*Für was drein geht und nicht drein geht,*
For what's occurred or not occurred.	*Ein prächtig Wort zu Diensten steht.*

To me, set theory and the axiom,	*Die Lehre von Mengen mit Axiomen,*
Is both a mill and a conundrum.	*Verwirrt meine Sinne, oh schrecklich Omen.*