Arnold Koslow
Arthur Buchsbaum
Editors

The Road to Universal Logic

Festschrift for the 50th Birthday of Jean-Yves Béziau

Volume II

Birkhäuser

Studies in Universal Logic

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This series is devoted to the universal approach to logic and the development of a general theory of logics. It covers topics such as global set-ups for fundamental theorems of logic and frameworks for the study of logics, in particular logical matrices, Kripke structures, combination of logics, categorical logic, abstract proof theory, consequence operators, and algebraic logic. It includes also books with historical and philosophical discussions about the nature and scope of logic. Three types of books will appear in the series: graduate textbooks, research monographs, and volumes with contributed papers.

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The Road to Universal Logic

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of Jean-Yves Beziau
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Preface

These two volumes gather together the tributes of a distinguished group of colleagues and friends in honor of Professor Jean-Yves Beziau on his 50th birthday.

The chapters in each of the two volumes (of which this is the second) fall, broadly speaking, into four categories:

1. those concerned with universal logic;
2. those concerned with hexagonal and other geometrical diagrams of opposition;
3. those concerned with paraconsistency, and
4. current work not directly connected to the work of Jean-Yves Beziau.

With these contributed chapters, we want to express our gratitude for the intellectual and organizational work of Jean-Yves in uncovering a golden tradition of logical thought, and his constant encouragement to all of us to ensure that tradition will continue and flourish. Many thanks, Jean-Yves. Our heartfelt thanks on your 50th birthday.

With the possible exception of the last category, there are three subdivisions of universal logic as conceived by Jean-Yves Beziau. In order to understand this project, we can do no better than to recall the way in which universal logic was compactly described by Beziau in the preface to what is probably the defining collection on the subject,[1] and to expand upon it, briefly:

(i) **Beyond Particular Logical Systems** "Universal logic is a general study of logical structures. The idea is to go beyond particular logical systems to clarify fundamental concepts of logic and to construct general proofs." (p. v)

(ii) **Comparison of Logics** "Comparison of logics is a central feature of universal logic." (p. v)

(iii) **Abstraction and the Central Notion of Consequence** "But the abstraction rise is not necessarily progressive, there are also some radical jumps into abstraction. In logic, we find such jumps in the work of Paul Hertz on Satzsysteme (Part 1), and of Alfred Tarski on the notion of a consequence operator (Part 3). What is primary in these theories are not the notions of logical operators or logical constants (connectives and quantifiers), but a more fundamental notion: a relation of consequence

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[1] Beziau [2].

defined on undetermined abstract objects that can be propositions of any science, but also data, acts, events." (p. vi)

(iv) **Beyond Syntax and Semantics** "In universal logic, consequence is the central concept. But this consequence relation is neither syntactical (proof-theoretical), nor semantical (model-theoretical). We are beyond the dichotomy syntax/semantics (proof theory/model theory)." (p. vi)

There are of course other themes that are characteristic of Universal Logic, but it seems evident to us that the first observation – (i) **Beyond particular Logical Systems** – indicates clearly that universal logic does not advocate a unique logical system that is the one correct, most expressive, accurate, and useful logical structure. Universal logic includes in its domain a host of logical structures in all their variety. But universal logic is not simply a catalog of all advocated or imagined logical structures, all logical possibilities, as it would have all the utility of a telephone book that is useful for certain problems, but cognitively dumb.

It is the second observation – (ii) **Comparison of Logics** – which adds intellectual content to the project. Comparison is indeed central to universal logic, but not comparisons of a valid kind. What is intended are comparisons that not only note the difference between logical structures, but explanations of why there are those differences in a way that reveal their different logical character. The second observation suggests that not only are comparisons offered, but there may be also many different ways of ordering those logics, and one cannot take for granted that those orderings or comparisons are coherent when taken together. This kind of issue is nicely illustrated when we think of a paper now commonly referred to as "Beziau's translation paradox".[2] Simply put, two logical systems K (classical propositional logic), and $K/2$ are described. Two orderings or relations are proved to hold: K is an extension of $K/2$ and also that there is a faithful translation of K into $K/2$. So there are two orderings. The first seems to indicate that K is clearly the stronger logic, yet the second result seems to say otherwise (that there is within $K/2$ a faithful translation of classical propositional logic). Each of the two orderings seems to measure the strength of one logic over another. According then to Beziau's concept of universal logic, comparisons are a central task, but it is also a task of universal logic to figure out what to do when the orderings seem to go in different directions. Beziau has suggested that it is like the so-called Galilean paradox, which notes that there are more square natural numbers than there are natural numbers, and also notes that those two collections are evenly matched. It is not that Galileo's solution is recommended for the Beziau example. That is not a possible way out, since Galileo thought that, in the case of infinite collections, the notion of "is larger than" just doesn't apply. The intended similarity, as we see it, is that in both cases there are two ways of explaining the notion of one collection having more members than another, and one logic being more powerful than another. The two ways give opposing verdicts, and the resolution of this situation, Beziau maintains, is a task that lies squarely within the province of universal logic.

We mentioned that the study of Hexagonal logics of opposition falls squarely within the province of universal logic, for they provide a good example of finite logical systems, with

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[2] Beziau [1].

a specified particular implication relation between their sentences (taken pairwise). In fact there is a growing literature which considers consequence relations on finite geometrical arrays of different dimension. All belong comfortably within the project that is universal logic.

We also mentioned that paraconsistent logics are included in the program. That should be obvious if one considers the various consequence relations to be found in that branch of logic. Also we need to mention the beautiful studies of Dov Gabbay in which he proposed the study of restrictive access logics as an alternative to paraconsistent logics that is an extension of classical logic.[3]

These restrictive access logics can be described by using a substructural consequence relation, where there is a modification of the Gentzen structural conditions on implication. It then becomes an interesting problem to see what features the logical operators have will have as a consequence.[4] The examples of paraconsistent and restrictive logics lie well within the province of present day logic.

In contrast, what is interesting and novel is that Beziau's observations in (iv) **Beyond Syntax and Semantics** permits the extension of the program beyond the more traditional range of contemporary logical systems. As he stated, not only can we have the notion of consequence for scientific propositions, and nonpropositional, nonsentential objects including, data, acts, and events, but we do now add pictures (perhaps mathematical diagrams), and even the epistemic notion of states of belief for which consequence relations exist, and the possibility of logical operators acting on pictures as well as states of belief. We are concerned with consequence relations that are beyond the semantical or proof-theoretical.

The case for a consequence relation between pictures has recently been forcefully made by Jan Westerhoff. Here, compactly, is the claim:

"I will describe an implication relation between pictures. It is then possible to give precise definitions of conjunctions, disjunctions, negations, etc. of pictures. It will turn out that these logical operations are closely related to, or even identical with basic cognitive relations we naturally employ when thinking about pictures."[5]

This example with its particular consequence relation, and the pictures it relates, is an extension well beyond the usual restriction of logic to syntax and semantics. It illustrates the broad implications of Beziau's observations in (iv) and the fertility of the project of universal logic. It is not business as usual.

Finally, we will briefly describe another case Peter Gärdenfors,[6] who developed a logic of propositions on the basis of a theory about belief revision. His results can be recast in such a way that they also follow as a case where he defines propositions as special kinds of functions, and also defines a special relation among those functions that turns out to be a consequence relation. The result is fascinating: the conjunction of functions turns out to be the functional composition of functions, and Gärdenfors' special relation among the

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[3] Gabbay and Hunter [4].
[4] Private communication from D. Gabbay, 2005.
[5] Westerhoff [6]. The implication relation proposed for pictures is similar to one that Corcoran [3] proposed for propositions, as noted by Westerhoff.
[6] Gärdenfors [5].

functions is a consequence relation provided that functional composition is commutative and idempotent.

More specifically, (1) let S be a set of states of belief of some person. (2) Let P be a set of functions from S to S (called propositions) which is closed under functional composition. (3) For any members $f_1, f_2, \ldots, f_n$ and g in P, let (G) be the condition that

$$f_1, f_2, \ldots, f_n \Rightarrow g \quad \text{if and only if} \quad g f_1 f_2 \ldots f_n = f_1 f_2 \ldots f_n$$

(the concatenation of two functions here indicates their functional composition).

In particular, for any two propositions (functions) f and g, f implies g ($f \Rightarrow g$) if and only if $gf = f$. It is easy to prove that the relation (G) is a consequence condition if and only if functional composition is commutative and idempotent. The logic of these propositions has been shown by Gärdenfors to be Intuitionistic, and his consequence relation (G) is clearly epistemic. Again, it is not logic as usual, but it is just one more case of the fruitfulness of the ideas that the project of universal logic embodies.

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Personal Recollections About JYB
by Newton da Costa and Others

Katarzyna Gan-Krzywoszyńska

Abstract The aim of this chapter is to present the personal recollections of some of Jean-Yves Béziau's friends and collaborators from all over the world. The chapter is divided into sections written by his supervisors, collaborators, and disciples, describing their first encounters and collaboration, and the inspiring work of Jean-Yves Béziau. They reflect on his rich personality, many different interests and talents besides logic, i.e., philosophy and art (music, film, paintings, photography) from the perspective of his endless travels and global organizing activity.

Keywords Universal logic · Paraconsistent logic · Philosophy of logic

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1 Licence to Think – My Friend Jean-Yves Béziau

I met Jean-Yves Béziau (aka JYB) for the first time in January 1991 during one of my systematic visits to Paris. He was then a young student interested in logic, particularly in paraconsistent logic. We discussed several topics related to these subjects and I became very much impressed with his personality and some of his ideas. Therefore, during my stay in Paris, with the help of Michel Paty, I tried to get a French scholarship for him in order that he would be able to spend some time in Brazil at the Department of Philosophy at the University of São Paulo, where I had a group of young colleagues and graduate students in logic and philosophy of science. Béziau got the scholarship and spent one academic year in Brazil.

He was an active participant in my seminar at the University of São Paulo, he decided to enter in our Ph.D. in Philosophy program, we collaborated in some joint papers, and he passed his Ph.D. thesis on philosophy of logic under my guidance in 1996. However, earlier he had returned to France for some time and obtained his Ph.D. in Mathematics at the University of Paris.

One of his first results that I cannot forget owing to personal reasons concerns the cut-elimination theorem and Gentzen's formalization of paraconsistent calculi, really a nice result. But the fact is that he devoted himself to various logical and philosophical themes.

His field of research may be classified in three basic areas: paraconsistency, universal logic, and the philosophy of logic and science. In these three domains, he made significant contributions.

However, Béziau is not only a logician and a philosopher, but he is also an excellent administrator, organizing several meetings and congresses of logic and philosophy in Brazil and abroad. This fact is of fundamental relevance for a country such as Brazil, contributing to its cultural development in domains of knowledge in which it is so lacking.

Béziau was one of my best graduate students, and today is one of my best friends. I believe that his independence of judgment and tendency to see the central problems of a given field of knowledge are evident in the following portion of a letter he sent to me from Wrocław, Poland, in November 1993 (the original was written in French):

"Considering the concept of structure as fundamental, we always start with a structure already given, which presupposes a notion of trivial identity, each element is identical to itself, two different elements are different. Then we can consider different notions of identity, among which the one mentioned above seems the most interesting.

What about quasi-objects? I think the quasi-objects can be precisely be those objects that are logically identical, but not in reality, hence the paradoxes of quantum physics. I think we can reject Leibnizian identity simply by noticing that it is not an absolute identity but a relative one. If we make additional determinations, if we complexify the structure, then objects that seemed to us identical will turn to be different. If we then consider that there is no fundamental structure, but a hierarchy of more or less complex structures each corresponding to a certain representation of reality, there is therefore no absolute concept of identity, since to change the structure is to change the notion of identity.

A different approach about the theory of proposition is what we might call the *axiomatic theory* of proposition, recently developed in particular by Suppes. We consider the proposition as a primitive term and we are looking for axioms characterizing it. The circularity of this approach is even more striking: the construction of an axiomatic system presupposes the notion of proposition, in particular an axiom defining what a proposition is.

Getting back to Curry, he takes as a starting point the notion of formal system and he considers that mathematics and logic in particular are part of a general theory of formal systems. His definition of formal system is based on a "formalist" approach, more or less close to the conception I called the materialist conception. The ontological nature of what he calls an "ob" is not very clear.

When certain objects are given, we can give them such or such names, following the interpretation that we have in mind and to which we are aiming at, in fixing some determinations, in one way or another, to these objects. The philosophical choice is performed at the first level, we are therefore not really committed when speaking of "proposition," "line," etc.

In my thesis, I developed to the full the tautological conception of logical truth, to see up to which point we can follow this direction. However, I think the tautological conception is not the only one, and can be included in a much more general context, considering structures of type $\langle L; \vdash \rangle$ where $\vdash$ is consequence relation defined on a set of objects L without a proper structure.

The term *abstract logic* seems to me to fit well for these kinds of studies, because it means in some sense we make *abstraction* of the nature of the elements of L by opposition to the usual method, *formal logic*, where the nature of the objects is fixed by the distinction form/content. The expression *universal logic* seems also excellent to me, especially in relation with the idea of *universal algebra* and the Bourbachic conception of mathematics. We can be *universalist* without thinking that there is only one logic.

I believe that if we want to go further and better understand the Bourbachic conception notion (or to reinterpret it), we must try to clarify the concept of *type* of structure type as opposed to *species* of structure (Warning! I am not using these notions of species and type according to the definitions of Bourbaki; cf. pages 130 and seq.). We should in particular precisely define the notion of type of structure which intuitively corresponds to a thought frame.

Regarding the new solution, and its relation to the usual method, I would like to make some additional remarks. The ordinary method today may seem natural, but it is rather a matter of habit. In fact this method did not appear suddenly, it is the result of a long development and the confluence of two very different streams: on the one hand, the linguistic stream (Frege, Peano, Carnap) and on the other hand, the stream of "structuralist" abstract mathematics. Frege is now considered as the father of the theory of quantification, but at the time he was writing the *Begriffsschrift*, the notion of structure was still almost inexistent. It is only in the 1950s that these two streams merged with the development of model theory. However, this wedding is not quite harmonious, and contains certain defects, the result of the superposition of two disparate ways of thinking.

Regarding quantification, everyone agrees that the intuitive interpretation of quantification corresponds to infinite conjunctions and infinite disjunctions. However, according to the usual method, there is no simple formalization of this intuitive interpretation, because it would be necessary to consider the proposition $\exists x Rxa$ not only as an infinite disjunction, but also as an infinite conjunction of infinite disjunctions, because the undetermined constants R and a must range over the whole class of structures.

My method permits one to avoid this problem by starting to work within a particular structure. As the fundamental idea of the tautological concept of logical truth is that logical truth should not depend on the nature of the structure, the notion of logical truth that will be defined will be the same as if we had chosen another structure, so we do not lose any generality."

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2   A Letter to Professor Jean-Yves Béziau

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December 5, 2014

Dear Professor Béziau, mon cher collègue et ami,

I am writing to you on the occasion of your upcoming 50th birthday on January 15, 2015. On this day, I would join the many logicians and philosophers from every continent who will be sending you their best wishes and congratulations. . .

I would also take this opportunity to sketch a few reminiscences of how we became acquainted, and our work together. The first time I encountered your name, though not you in person, was when the Section for International Collaboration at my university, the University of Wrocław, approached me in a letter dated April 8, 1992, asking me to give you a 10-month academic fellowship with the Department of Logic and the Methodology of Sciences (on a French government stipend). After reviewing your research proposal (projet d'étude), which began with the words,

«Les logiciens polonais furent au début de ce [XXᵉ] siècle les principaux fondateurs de la logique moderne. . . . Une des particularités de l'école polonaise de logique est qu'elle a toujours considéré comme primordiales les questions philosophiques alors même que la logique se faisait de plus en plus mathématique. Il en résulte une conception très générale de la logique étroitement liée au problème des fondements de cette science.»,

. . . and noting your extensive training in the foundations of logic and philosophy (from Lycée Henri IV, Université Paris 1 & Paris 7, and the University of São Paulo), it did not take me long to agree: on April 23, 1992, I informed my university's authorities that you would be a research fellow in my charge from October 1, 1992 to July 31, 1993. Things went well, and the following year the term of your fellowship was extended by another five months, to December 31, 1993.

We met in person in early October, 1992, at Wrocław's main train station, Wrocław Główny; after exchanging greetings I drove you to your hotel in my Fiat 126p, known in Poland as a "little" (*mały*) Fiat. I do not remember exactly, but it was probably the hotel attached to the Polish Academy of Sciences, at 75 Podwale St., near the German consulate. From mid-October on, you lived in Apt.18–21 Plac Grunwaldzki, a small flat the University has for visiting academics, at the χέντρον of Wrocław's old intelligentsia neighborhood, where the polytechnic and university communities meet. My *mały* Fiat again got you and your bags there. But I will leave those details for another day, interesting though they be, and try to tell you how I view the fruits of your time in Wrocław from the vantage point of today.

You learned about Polish logic, especially its approach to the theory and methodology of sentential calculi. At your insistence I suggested lots of contemporary authors you should read, such as (in alphabetical order) G. Bryll, J. Czelakowski, W. Dzik, W. Dziobiak, J. Kabziński, J. Łoś, G. Malinowski, M. Omyła, J. Perzanowski, W.A. Pogorzelski, T. Prucnal, S.J. Surma, R. Suszko, P. Wojtylak, and A. Wroński. Your work frequently cites their investigations and results; hence you are their heir and successor.

You established personal contacts with many logicians and university centers of research into logic in Poland. I remember that the first such contacts I helped you establish were with people at universities in Łódź (Malinowski), Kraków (Perzanowski & Wroński), Kielce (Prucnal), and Katowice (Dzik & Wojtylak). Later, over the next two decades, you expanded your contacts and collaboration to other logicians and centers of logic research in Poland, e.g., the University of Toruń (Jaśkowski's Memorial Symposium in 1998), Adam Mickiewicz University in Poznań, and Jan Długosz University in Częstochowa (the conference "Application of Logic in Algebra and Computer Science," Zakopane 2006).

In 1992–1993 you were an active participant in my seminar in the Logic Department in Wrocław. I can confirm this by recalling the titles and dates of your lectures (in a historic building and room: 36 Szewska St., 4th floor). . .

(a) "On abstract universal logic" (10 December 1992);
(b) "Rules and derived rules" (21 January 1993);
(c) "On Russell's paradox and the liar antinomy" (1 April 1993);
(d) "On a problem posed by T. Prucnal" (6 May 1993);

(e) "What is negation" (14 October 1993);

(f) "On logical truth" (18 November 1993).

Notice that all those dates were Thursdays, which was the traditional day for the seminar to meet. Some of your lectures were delivered to joint meetings of the Logic Department and the Wrocław branch of the Polish Philosophical Society. It may be worth adding that 1993 abounded with foreign guests; the Department enjoyed talks by Peter I. Bystrov (Moscow), Thomas Uebel (Boston), Antonio de Freitas (Covilhã, Portugal), V.V. Rybakov (Krasnoyarsk), and Jan Tarski (Berkeley).

By the way, do you remember the trip we made to the sacred Mount Ślęża in mid-May, 1993, partly on account of Rybakov's being just then in Wrocław? It has had so many different names over the ages: *monte Silentii*, *monte Silencii*, *Monte Slenz*, *Zobtenberg*, *Góra Sobótka*. Remember the prehistory of it: how, in the Neolithic period, at least as far back as the 7th century BC, the heathen tribes of the Lusatian culture were living there? And then it was settled by Celts, and later by Germanic Lugians? Our group, consisting of you, Rybakov, Max Urchs, Jacek Hawranek, the late Dr. Krzysztof Zielnica and myself, went to explore the remains of those cultures in the sanctuary, and then we "conquered" the summit. A nice photograph still survives, documenting that experience, recording the bright green spring colors. Hawranek recalls that during the trip, perhaps under the influence of the history of the place, you gave us a mini-lecture on *La Chanson de Roland* – the oldest surviving major work in French literature.

While in Wrocław, in 1993, you wrote two papers: "Recherches sur la logique abstraite: logiques normales," and "More about the connection between the Axiom of Choice and Lindenbaum's extension lemma." The first was published in the "*Logika*" Series of our University's journal *Acta Universitatis Wratislaviensis – Logika*, vol. 18 (see Zbl 1023.03523). The second came out later under a somewhat different title: "La véritable portée du théorème de Lindenbaum-Asser" 'The real import of the Lindenbaum-Asser theorem' (see Zbl 1013.03033).

Over the time you were here, 1992–1993, you also completed a doctoral dissertation, titled "*Sur la vérité logique*," which you submitted for a Ph.D. in philosophy at Université Paris 1 – Panthéon–Sorbonne in October, 1993. [Your advisor was Philippe de Rouilhan, who maintained close relations with logicians from the University of Łódź. A copy of your dissertation, which I keep to this day, was graciously given me by its author on June 24, 1993, along with another typescript, "*La logique paraconsistante*", by Newton C. A. da Costa and Jean-Yves Béziau.] I did not have any direct influence on the content of this dissertation "on logical truth". I recall discussions with you on the topics raised in it – discussions which were conducted at 36 Szewska Street over quantities of coffee and tea. My role consisted mainly of suggesting relevant readings from the literature on the subject, which can be found in the list of references at the end of the thesis. Despite the fact that my contribution was slim, you did me a great honor; the last sentence of the dissertation reads:

> "L'auteur tiens à remercier MM. les professeurs Newton C.A. da Costa et Jan Zygmunt qui l'ont accueilli respectivement au Brésil et en Pologne."

The fruits of your Wrocław sojourn are further evident in your second dissertation, which you developed and finished in the first half of 1994 in Paris, where you went after

Wrocław. This second dissertation, titled "*Recherches sur la logique universelle (excessivité, négation, séquents)*" (see MR 1645129 (99f:03008)), was submitted to the Université Denis Diderot – Paris 7 in partial fulfillment of the requirements for a *Doctorat de Logique et Fondements de l'Informatique* – a type of doctorate degree, existing in the French system, distinct from a Ph.D. Professor Daniel Andler was your advisor, and I was honored to be a member of your examining committee for this work. The discharge of my duties in this role, which would have been a pleasure for me under any circumstances, involved on this occasion the additional delights of visiting Paris at the beginning of July, 1995, and being able to meet Marcelo Tsuji and Richard Zuber while I was there.

Dear Professor Béziau – *Drogi Jubilacie*,

We could reminisce on and on – But this letter should come to a point, so I shall save further memories for your next jubilee. Nevertheless, I must add one more thing: It is said that no man lives by bread alone… and in our case "bread" can be taken to mean "logic." I and my Wrocław colleagues remember your many and varied interests: in art, in literature, and film. In your spare time you painted in oils, and wrote a novel. You were passionate about film, and the history of film. You established close working relationships with the Wrocław division of Alliance Française, and its director, Madame Teresa Pękalska. Through them, you arranged and led enthusiastic classes on French cinema. You held Polish filmmakers in high esteem, particularly Krzysztof Kieślowski, and you were adamant in your assessment that his *Trois couleurs: Rouge* was by far his best picture. I also remember your writing to me, that once at a film festival somewhere in far-off Brazil you were profoundly touched by a particular Polish entry – a psychological drama about loneliness, directed by Dorota Kędzierzawska, titled *Wrony* (Crows).

Nearly 23 years ago, when you were writing your *projet d'étude* with the intention of moving to Poland and studying Polish logic, you stood, in fact, before a great unknown. But even then it was clear that your plans and intentions were underpinned by an unshakeable belief in their rightness. Later you would go on to harness this same strength of conviction in the service of your supreme idea, the idea of *universal logic*, and to bring the idea to life in the form of an international journal, *Logica Universalis*, a book series, "Studies in Universal Logic," and the creation of World Congresses and Schools on Universal Logic. Since then many Polish logicians have been invited by you to collaborate in the field of universal logic and are deeply grateful to you for the opportunity. In particular, I, and three of my colleagues, Janusz Czelakowski, Piotr Wojtylak, and Robert Purdy, sincerely thank you for providing us with this chance to be part of your enterprise, and we send you our heartfelt *félicitations*.

From all of us I would say: Stay forever free-spirited and young in your soul. Keep forever true to your innermost compass. There are precious few Rimbauds in this Hobbesian world. Let us not lose one of its last lights.

Yours sincerely,
Jan Zygmunt

Translated by Robert Purdy

3 Dr Yes-and-No

Between 1990 and 1992, I worked at the Department of Computer Science of the University of Buenos Aires (UBA), in the Group for Artificial Intelligence (GIDIA), led by Adolfo Kvitca, in close collaboration with Carlos Alchourrón's group of logic at the Law Faculty of UBA. During that time, we received many visiting researchers from a variety of countries, including Newton da Costa (who inspired me to move to Brazil), David Makinson, Peter Gärdenfors and, in April 1992, a young, brilliant, and enthusiastic French logician, named JYB. After his very nice talk on a general theory of valuations (which pleased all the audience, including Carlos Alchourrón), we talked about logic in my office at UBA for about an hour. I was surprised at his broad knowledge of the subject, despite his being young.

We met again in July 1994 in São Paulo. At that time, both of us were studying for our respective Ph.D. degrees at the University of São Paulo (USP). Jean-Yves was concluding his first Ph.D. in Paris under the supervision of Daniel Andler while working on his second Ph.D. thesis at the Philosophy Department of USP under the supervision of Newton da Costa, and I was working on mine at the Department of Mathematics under the supervision of Francisco Miraglia. Our friendship began then, spending long nights at the exotic bars of downtown São Paulo, or watching classic movies and listening to music together with other friends in my small apartment at Estação da Luz, over a period of several years. He moved to Rio de Janeiro and Petrópolis by the end of 1995, but our cultural meetings have continued through to the present day, due to periodic visits in both directions.

From an academic perspective, I learned a lot of Logic from Jean-Yves' papers and personal communications. He has plenty of original ideas, and his insights are remarkable and inspiring. He always surprises me with original perspectives and observations. His tireless work as a promoter and disseminator of Logic as a broad discipline, interacting with several other areas of knowledge, is also outstanding.

I would like to send my warmest congratulations to Jean-Yves for his remarkable academic work and career (observing that he is only 50!), and I would like to thank him for his sincere friendship during these years.

Marcelo Coniglio
UNICAMP
Campinas, Brazil

4 From St. Petersburg with Snow

I first met Jean-Yves through my colleague Vladimir Vasyukov; I cannot now remember the exact dates and circumstances but most likely this happened in 2003 in St. Petersburg. In 2005, I've got an invitation from Jean-Yves to give a tutorial on Categorical Logic at the *First World Congress and School on Universal Logic (Unilog)* in Montreux (Switzerland). In the intellectual and political climate of the 2000s, which especially emphasized the need to tolerate multiple systems of thought as well as multiple systems of logic, the title

"Universal Logic" sounded very provocative. This name could be used for a certain system of logical norms offered as the only "true" logic – against the current trend to logical pluralism. However, I quickly learned that Jean-Yves' idea was different and actually more interesting. It was about bringing together many different people working in various areas of logic (including people coming from outside the current academic mainstream), making them to talk to each other and finally asking them to describe a hypothetical notion of "universal logic," which, if it makes any sense at all, remains invariant through a wide variety of things found under the name of logic on the contemporary intellectual market. I am very grateful to Jean-Yves for this kind invitation, which I used for systematizing my own knowledge and ideas about the subject and for learning a lot of contemporary philosophical logic.

This and some other meetings organized by Jean-Yves and our personal discussions gave me quite a lot of inspiration for my further work. And it still inspires an important part of my research today. Among other things, this concerns the concept of logical translation, i.e., translation between conceptual frameworks or "different logics." This sort of translation not only allows different systems of logic to talk to each other but also determines the core structural features of these very particular logical systems. See my abstract "Logical Forms versus Translational Categories" in the Unilog2007 Handbook and also, for a keen approach, "Homotopical Categories of Logics" by Peter Arndt in the first volume of the present Festschrift, pp. 13–58. I believe that this translational view on logic is very promising and deserves to be further developed. I also believe that Jean-Yves has made a great contribution to this and other research projects, which fall under the scope of universal logic in Jean-Yves' very liberal and always friendly sense of the word.

Happy Birthday, dear Jean-Yves, and Many Many Happy Returns!

Andrei Rodin
Saint Petersburg University
Saint Petersburg, Russia

5 "Torpedo" Béziau

I have been kindly asked to accomplish the following task, namely writing some words about the hero of the day, viz. Professor JYB ("Beez-you," with the English-worldwide accent), at the occasion of his half-centenary. It is my pleasure to reply positively to such a proposal, all the more that a lot has to be said about this public character. Let me just say a couple of words about him; however, English is not my *Muttersprache*, and this is only a sketchy portrait, but here it is, as far as I can honestly picture it.

A well-known football club in Moscow is called "Torpedo Moscow,"[1] where the first word has a blatantly military meaning that everyone can guess. But another reading also refers to the sea-fish philosophers are very familiar with: it is the fish which served as a nickname for Socrates, due to his legendary capacity to address people in the street with

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[1] Note to the purists: write "торпеда" in Russian, but " Торпедо Москва" for the whole name of the team with a genitive declension of the word.

simple questions before leaving them with serious headaches. Jean-Yves is exactly like one of these provocative dialecticians, juggling with concepts just as some humorists may play with boundaries.

But Socrates also struggled against the Sophists, and Jean-Yves seems closer to these when dealing with paraconsistent flows. Like a Sophist, but in a neutral sense of the word; not the pejorative one which so harshly affected the official memory of genuine thinkers from ancient Greece such as, e.g., Heraclitus. And yet, the Sophists flirted with conventions; whether for want of money in life, or for any other reason. Anyway, it is much fairer to say that Jean-Yves' sarcastic mind nicely matches with that of someone like Diogene of Sinope. Had Kripke asked him anything, Jean-Yves would have ordered Saul to stand out of his light; certainly, because he could not read his non-truth-functional matrices on the wall, or the like.

Indeed, one of the best moments I experienced during Jean-Yves' talks was the very first one in Montreal on September 2003. We were attending a conference organized by the Francophone Society for Analytic Philosophy (SOPHA). Jean-Yves talked about possible-world semantics, a famous "hot topic" among those one is delighted to put on the table for very philosophical purposes. What of Jean-Yves? He simply threw the modern idol on the floor, mocking those who venerate the Holy Accessibility Relationship and claiming that this machinery was nothing but an extensive by-product of algebraic bi-functions. I have to point out that it was my first time as a conference speaker. Not sure that most of the usual speakers had such a subversive mission in mind, speaking in a distant way to astonished people while eating grape breads. Then the discussion came to be somehow "dynamic," once the idol had been hurt and underestimated by an incredulous torpedo.

Likewise, all of Jean-Yves's talks play with pedagogical pictures and so general ideas that most of the listeners do not want to take seriously. Wasn't it the same with the foolish Diogenes in ancient Greece, whether for right or wrong reasons? Identity, Proposition, Truth-Value, Opposition, Logical constants . . . our Professor is used at launching insightful discussions with simple ideas, and it is not the least courageous philosophical act to do this. Borrowing from Timothy Williamson's words: "To be precise is to make it as easy as possible for others to prove one wrong. That is what requires courage."

From excessively simple words to really strong points, let me quote some main contributions of Jean-Yves: the S5-translation of paraconsistent negation, following Gödel's S4-translation of intuitionist negation, non-truth-functional matrices non-classical constants, and a reply to philosophical objections concerning the nature of paraconsistent negation (cf. Slater's challenge), a revival of the ancient theory of opposition, following Robert Blanché's developments, and the launching of a bunch of new results (especially with one of his former students, Alessio Moretti).

Finally, he is an everlasting globetrotter going throughout the world and spreading in exotic countries some exciting events like *Unilog*, *The Square of Opposition*, together with a top-level scientific journal (*Logica Universalis*) and a collection of book series for logicians, mathematicians, and philosophers, and a clear editorial success *à la Gabbay*.

I have only talked about what I am most familiar with, being aware that a huge number of technicalities Jean-Yves faced largely go beyond my mental capacities. However, I still take him to be the one who stimulated my first pure reflections about formal semantics, negation, or the logical concept of opposition, until the day when he agreed to be a jury

member for my Ph.D. defense on March 2007. Something about epistemic modalities
… here is just a way to refresh his mind with Kripkean possible worlds, or Hintikka's
epistemic logic.

Jean-Yves, in a nutshell is a logical comet between Molière and Diogenes, and not
far from Montherlant in attitude. Not regarding his style of writing, I must confess, due
to Jean-Yves's inner struggle with the French syntax and his clear taste for rational ab-
stractions rather than lexical subtleties. Someone who never forgets to point at those Mr
Jourdains of philosophical logic, i.e., those playing seriously with truth valuations just as
kids wage war with tin soldiers.

Now I should return to my own conceptual toys. I just sketched our beloved scratching
powder in a very subjective *Gonzo* style that some readers might find appropriate or not.
Tertium non datur, notwithstanding the blatant affinity between many valuedness and our
dear Professor, alias Jean-Baptiste Torpedo Béziau of Sinope.

To the Baron of Chambourcy, pending another future heading for our common master
of situationist logic.

До скорого, дорогой Жан-Ив![2]

Fabien Schang
National Research University Higher School of Economics
Moscow, Russia

6   The Man with the Golden Thought

I do remember the Jean-Yves of the old days – pretty much the same as he is now but with
time enough on his hands for long rides toward artificial cities on Brazilian coaches. He
was an enthusiast of new breeding grounds: Schopenhauer, universal algebra, Badiou and
non-classical logics were his ingredients at the time. I recall universal logic being roughly
ready in his head as a road if not as a castle. I suppose he likes castles less. Then he hit the
road. I met him again years later for a night out in Palo Alto. He was sort of a habitué. He
spent the evening showing me the core of the place. And how unfulfilling it was! I suppose
it is a logician's way to go places – see the (hard) core of it and you see its imbrications.
His approach to seeing places, I suspect, was like the ideas of universal logic he had been
cherishing: make a mosaic of these cores. No place, like no logic, is fully and universally
satisfactory. But you can hope for something out of a cubism of (hard) cores.

Hilan Bensusan
University of Brasília
Brasília, Brazil

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[2] "See you soon, dear Jean-Yves!"

7   Jean-Yves Béziau's Imprint on Universal Logic

I first met Jean-Yves in 2005 in Mumbai when we both were on our way to a conference in Pune. He had rented a car and we traveled there together, and afterward we went on for a spontaneous roadtrip. Altogether we spent around two and a half weeks together, connecting our thoughts, discussing logic and life, and encountering incredible India. This was a marvelous start and our paths kept crossing, and will hopefully continue doing so for a long time.

When I first encountered the idea of universal logic (this was before meeting Jean-Yves), it struck me as natural and convincing. However, I could not imagine how such a grand and general undertaking could be pursued in a focused way, how it could be more than just disconnected research, driven by individual curiosities, and maybe somewhat randomly forming a bigger picture over decades. Seeing Jean-Yves in action taught me otherwise.

With the efforts he put into articles, lectures all around the world, creating conference series and book and journal series, Jean-Yves managed to transmit his ideas widely and to convey the impression that there is indeed a big picture to be understood, a goal to reach for, and that conscious effort can bring us closer to it. He got a lot of people engaged in the project.

One reason that he succeeded is, of course, that the idea of universal logic itself is good.

Another reason is his remarkable openness to ideas, his huge willingness to learn from others who have thought about a subject, and his ability to connect the different things that he learns. He must have opened the eyes of quite a few people to the fact that what they are doing is related to different activities in ways that they never suspected (the square of oppositions is a prime example). This got them interested in universal logic, and made them see where they had something to contribute.

And the third reason is his own style in research (which is something that is not easily found in science). Careful analysis of situations and solid arguments should be part of any scientific action.

But Jean-Yves has two further trademarks: he asks fruitful and intriguing questions and puts a major emphasis on them. They are ambitious but just within the reach of making progress. And they are not rhetoric; he wants people to try and give answers (as exemplified by the Unilog contests). He is also great at bringing up examples, not just for clarification but also for pointing out our confusion about some ideas, and showing places where we can strive for a better understanding (think of the collapsing problem in the fib ring of logics).

All of this made universal logic the project of many, while bearing Jean-Yves's personal imprint. So, Jean-Yves, keep up your inviting and challenging style; it has served us well! Happy birthday!

Peter Arndt
University of Regensburg
Regensburg, Germany

8 The World Is not Enough

I first met Jean-Yves in 2004 in Portugal. That was also my first encounter with his universal logic project, which was advertised on that occasion. I immediately had a strong feeling that I had met with the long awaited home in logic for my activity. Gradually, we have also become good friends. Jean-Yves is a highly unusual character in contemporary academia. In a scientific world dominated by narrow specializations, autism, and ruthless competitiveness, he brings in a wide perspective and an impartial approach. He persistently provides dedicated support for ideas outside mainstream scientific activity. Many of them, albeit very interesting, can be marginalized or even ignored just as an effect of the toxic competitiveness that dominates our academic world. For this, I regard Jean-Yves as a sort of intellectual hero.

This kind of intellectual generosity may also bear some costs. The events around Unilog are too big compared to how much the highly substantialist Western scientific culture is capable of accommodating the nonsubstantialist thinking underlying universal logic. The latter seems to be related, at least in spirit, to other scientific traditions of humankind that modernity has put in the shadows. In my view, there is a danger that authentic universal logic thinking may become marginal within Unilog events. But with wisdom and care, I think that this can be avoided and universal logic will fulfill the prophecy of some paramount scientists, as a true renaissance of mathematical logic.

Răzvan Diaconescu
The Romanian Academy & Școala Normală Superioară București
Bucharest, Romania

9 On Logic's Secret Service

I had a lively image of JYB even before we first met, back in 2001, for a logic event in Las Vegas, USA that he was organizing. A number of common acquaintances had told me about his work and interests, but also about his colorful and outspoken French–Brazilian character, and I must say that I was not disappointed. I had recently become interested in his work on the theory of valuations, which I found extremely interesting and which ended up being very influential to my own research on generalized compositional meaning and the combination of logics. We got along very easily from the first moment, and have kept in regular contact ever since. JYB visited me in Lisbon, Portugal on several occasions, and I also visited him in Neuchâtel, Switzerland, and most recently in Rio de Janeiro, the Land of the Future. Over the years, we ended up spending many hours discussing this and that, some of the happiest over a glass of wine, ranging from logic, science, mathematics, philosophy and art, to politics, and life in general.

Along with his talent for thinking out of the box, JYB has an eye for simple but profound problems. As Lloyd Humberstone put it, and I could not say better, JYB "has

a knack for noticing areas of logical theory where we find ourselves with intuitions pulling in different directions." I do not know where JYB's wit comes from, in part certainly from his multidisciplinary background, but I am sure that his inquisitive globe-trotting nature is an important part of the equation. He seems to have visited every logician around the world, knows about their research, and is able to pick all these scattered inputs (we all know how scattered they can be) and understand the common ground. His universal logic initiative, including the World Congress and School, the journal, and the book series, is the remarkable result of his vision, but also of his resolve. I have done it personally, but it is only fair to thank JYB again, on this occasion, for such a remarkable indelible effort.

JYB and I have collaborated on several initiatives, events, committees, and projects, and have discussed many ideas for joint work. As JYB would put it himself, all you need is "um prrobleo interressante." We have identified several such interesting problems together but, as I write, my JYB number is sadly still 2. I am sure that one of the ideas that we have in the freezer will eventually come to life, but now it has become urgent: we shall not wait for another 50 years, and no Icelandic volcano will prevent that!

Happy birthday, aquele abraço.

Carlos Caleiro
University of Lisbon
Lisbon, Portugal

10   Jean-Yves: Logician and Globetrotter

How many people know that JYB published a paper on the philosophical conception of suicide in Schopenhauer? Surely many know him nowadays as a serial organizer of conferences all over the world, and as a prolific editor of journals and books, with topics related to intersections of logic with philosophy, mathematics, computer science, linguistics, psychology, theology, and arts. But who else would think about doing a complete Ph.D. in Brazil, after having defended a successful doctoral thesis at Paris 7? And who else would dream of becoming a professor in Brazil after acting as a professor in Switzerland? Who in the world would strive to organize a scientific conference at Easter Island?

The man who counts maybe as the only incarnation of Bourbaki as a philosopher has been for years tirelessly circumnavigating the globe, madly sailing into all sorts of research centers. This is the man who stops and takes pictures at stop signs, who brought logical insights to penguins in the far south, as well as to hardly accessible tribes in the Amazon, the man who has been both praised and condemned for smuggling turbo-polar paraconsistent logic into Poldavia.

His influence in my work started as soon as I did my first proper courses on logic. I have learned a lot from him about the intricacies of bivalence, about the many varieties of paraconsistency and of modalities, about the complexity of identity, about the paradoxes hidden inside the notion of translations between logics and revealed by the combinations of logics… and logicians. Since then we've met (often by sheer chance) in the most

unlikely places, from a secluded island in South Africa to an old mosque in Turkey, from the streets of São Paulo to the Costa Rican jungle.

It's been almost 20 years now, Jean-Yves and we have still not gotten bored of living this adventure. Many thanks for being a good friend all along, and for making our logical path so much more exciting!

João Marcos
Federal University of Rio Grande do Norte
Natal, Brazil

11 On JYB

Basically, I describe my impressions of an icon, an idol I have. I remember very well when I met Jean-Yves. Indeed, I had already read one of his articles and, for that reason I was pretty much interested in meeting him personally. He was sitting on a bed pool in a hotel in South Brazil talking with a woman. He had a weird hair, a red nose, and I tried to approach him asking some questions on modal logics. But he declined to answer arguing that he did not know anything about modal logics. However, some days later, to my surprise, I started receiving by post packages of his articles on many aspects of modal logics! What a paraconsistent character!

Enjoying since then we have had a prosperous collaboration, where I learned too much, and he invited me to join his research group on universal logic at the University of Neuchâtel, Switzerland. There I recognized that I got much more than a Ph.D. supervisor, but a real friend, the kind of friend we find only two or three times in life.

Zooming in, he has a universal, generalist, and rare mind which attracts all kinds of collaborators and persons, making him a natural ambassador of logic in the domain of culture, connecting it to even the most unexpected topic. Being a workaholic, he always organizes meetings, writes papers, edits books in nonstop mode.

In his great care and attention to people, we discover a holy being, who is a gentle and helpful person: each human being is super valued when in touch with him. He tries to make each one develop its own powers, stimulating research and creative thinking in a way that is very difficult to describe.

After all, what really attracts me in his personality is that his way of thinking is not a provincial one because he has a very good philosophical *ouverture* to discuss all tendencies. Without prejudices he is always open to debates, and does not try to impose his concepts and ideas.

Unique, original, creative, not dogmatic, and with a good sense of humor, JYB is my favorite philosopher and logician.

Alexandre Costa-Leite
University of Brasília
Brasília, Brazil

12   The Real Universal Thinker

I have known JYB for 11 years. *The First World Congress and School on Universal Logic – Unilog'05* in Montreux was the first major congress I had ever participated in, thanks to Jean-Yves, also as a member of the organizing committee. First, Unilog was a huge success, an absolutely fantastic event in a very beautiful place by Lake Geneva in the Alps. It was the time when I decided to participate whenever possible in all the events organized by Jean-Yves.

12.1   Some Unknown Facts About Jean-Yves

Fact 1 Because he was living some time in Corsica he was given the nickname "Napoleon," but I am sure it was also due to his strategic abilities and logical genius.

Fact 2 He once wanted to be a rock star. It is said that in Switzerland he had a band with some other now renowned researchers. I think rock and roll may have lost a great star, but surely logic has a much more fun spirit thanks to the failure of Jean-Yves' music career. Anyway, I think that in this way he has more devoted fans.

Fact 3 He loves Smurfs and has a collection of Smurf figures. Jean-Yves considers this to be a very philosophical cartoon, and after many philosophical debates, I still think that Peanuts beats Smurfs, but this remains an open metaphysical problem.

Fact 4 His father was the first person who crosses the Sahara desert on a BMW motorcycle.

Fact 5 His mother made her communion in a dress made from a parachute of Antoine de Saint-Exupéry, souvenir or an emergency landing of the aviator in the property of her family.

Fact 6 Deep down he is a Polish guy with a Slavic soul. How do I know this? First of all, he is a great logician, he has a great imagination, he is extravagant, he has a special absurd sense of humor, and he is quite repetitive, but he is still very funny, that is, when he is not being extremely repetitive (like telling the same joke 20 times in the same evening). He is very inspiring and a truly great friend. He enjoys good, strong alcohol, herrings, and poppy seed cake. And he never gives up. And here the proof ends.

12.2   The Art (of Life) by JYB

He is an art lover and an artist at the same time. Perhaps, it is not even a love, just an organic part of his existence. Whether it is photography, drawing, music, painting, film