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Unexpected precursors of Popper's World Three

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The existence of an objective and autonomous world 3 Popper says to derive from a tradition in philosophy initiated by Plato and continued by Bolzano and especially Frege. Indeed, Popper's world 3, as he himself confesses, "resembles most closely the universe of Frege's objective contents of thought."¹ Despite this impressive background I will argue that Popper's objectivist epistemology developed within a much more insular and, particularly, psychological tradition. As I have shown in my *Popper, Otto Selz and the Rise of Evolutionary Epistemology*, German *Denkpsychologie*, in particular the work of Popper's supervisor Karl Bühler and Otto Selz, has been of formative influence on his early methodology and epistemology as put forward explicitly in his *Die beiden Grundprobleme der Erkenntnistheorie* and more implicitly in *Logic of Scientific Discovery*.² A crucial role in all this is reserved for the contrast between what Popper calls a Bucket theory of mind and knowledge and his own Searchlight theory. This contrast, I argued in my book, is modelled on Otto Selz's contrast between association psychology and his own theory of problem solving, his theory of complex completion. My aim in this essay is to show that the distinction between the Bucket theory and the Searchlight theory, and hence the Selzian distinction, is also at work in Popper's defence of a World 3. Given Popper's fierce anti-psychologism this background may seem surprising, still my further claim is that the distinctive feature of transcendence of Popper's world three was not hindered by but rather helped by the program of Bühler and Selz.

Schematic anticipations and the theory of the Searchlight

In a lecture delivered at the European Forum of the Austrian College in 1948, published as "The Bucket and the Searchlight: Two Theories of Knowledge," Popper nicknames the empiricist view of mind and knowledge the "Bucket theory" since it conceives of the mind as nothing but the conduit for sense-impressions, an empty bucket to be filled by the accumulation and storage of information.³ The Bucket theory of knowledge and mind may be

firmly entrenched in both philosophy and psychology (and even in common sense), yet it is roundly rejected by Popper. In his hands the Bucket theory collapses under the strain of philosophical arguments and scientific facts, and is replaced by a theory which maintains that our knowledge of the world is partly drawn from our mind and constructed from the repertoire of knowledge dispositions we already possess. A key feature of Popper's theory of trial and error elimination is its insistence on problems or expectations taking precedence over observations. The place accorded to sense perceptions in the empiricist tradition is now reversed, for rather than being the origin of knowledge their role is limited to later stages. Assuredly, sense perceptions inform us about the external world, but from this, Popper argues, it cannot be concluded that they are the *fons et origino* of knowledge. Observations are always preceded by expectations, points of view, questions or problems which, as a searchlight, illuminate a certain area, thereby enabling the organism or the scientist to know what to observe in the first place. Indeed, from an evolutionary point of view even our sense organs are the outcome of a series of biological problems and attempted solutions. Knowledge and experience, then, rather than being the passive outcome of the accumulation and association of sense perceptions are constructed from the built-in repertoire of expectations and dispositions. Guided by preceding expectations lower and higher organisms constantly and actively put forward trials or attempted solutions when faced with problems of any kind. The Bucket theory of knowledge and mind of the famous British philosophers Locke, Berkeley and Hume, Popper concludes, is a myth. Evidently relishing in his position of the opponent he triumphantly claims: "My theory of knowledge is thus quite revolutionary: it overturns everything my predecessors have said up to now. *We are active, we are constantly testing things out, constantly working with the method of trial and error.*"⁴

The Searchlight theory of knowledge then is basically a theory of problem solving. Nowadays this would be called a psychological rather than a philosophical endeavour. But also in Popper's own times, in the first two decades of the last century, problem solving was the province of psychology, or rather the psychology of knowledge. In fact the young Popper initially formulated a theory of problem solving as a psychologist himself. In a short publication, "*Die Gedächtnispflege unter dem Gesichtspunkt der Selbsttätigkeit*," Popper applied a theory of problem solving to a pedagogical debate between, on the one hand, the *Lernschule*, and, on the other, the *Arbeitsschule* of Eduard Burger concerning the role of memorization in education.⁵ The labour schools attempted to steer education away from a drill school approach, typical of the *Lernschule*, towards seeking children's active engagement through self-discovery. The ensuing description of the psychology underlying the

pedagogical program of the *Lernschule* shows Popper using for the first time the Bucket metaphor which will figure prominently in his later writings: “To the *Lernschule* memory is nothing but a container of material, a sort of bucket of knowledge.” The essence of memory, on this view, is to let in and store knowledge. Indeed, the only properties of the bucket are its more or less reliable storage of knowledge, and its having a certain space. The fundamental mechanisms for cementing different items of knowledge firmly together are those of association. The consequences for pedagogy are that mnemonic exercise can only be achieved by repeating the process of storing and retrieving of information as much as possible, and by an accumulation of dictated knowledge which will enlarge memory space. Popper’s later formulations of the Bucket theory only differ in matters of target, i.e. philosophical empiricism, not of content.

In 1931, the Bucket theory is not yet overturned by, or even contrasted with, what Popper regards as one of his great achievements: the development of a Searchlight theory of the mind. The theory that does replace the Bucket theory, however, is the theory of Otto Selz. The Bucket theory, Popper goes on, is a psychology of memory “more or less the same as the outlook of association psychology. Unfortunately, association psychology, even though its very complete breakdown has been the main result of psychological research at the turn of the century, is still widespread. This decisive turn in the psychology of thought (and of memory) was initiated by Kant and carried through, according to strict experimental methods, by the school of Külpe, especially Bühler and Selz.”⁶ The fundamental mistake of association psychology, Popper argues, is its attempt to derive the whole of human memory, even the whole of intellectual capacities, from a single and simple form of associative memory (what he calls the bucket).

Popper’s alternative account of the genesis of the different functions of memory follows Selz’s cognitive psychology in detail. The role of associative memory is restricted to the processing of nonsense syllables in the laboratory, but even in such rather artificial situations, Popper argues, subjects often establish meaningful connections between stimuli. With this understanding of meaning, Popper concludes, thinking enters memory: “The laws of the mechanisms of association are replaced by the ‘laws of ordered thinking’ (Selz).”⁷ And a few lines further: “Selz has coined the name ‘intellectual operations’ for the functions of thinking.”⁸ That Popper’s alternative account of memory and memorization wholly depends for its conception on ideas he takes over from Selz is corroborated by a passage in which the latter’s theory of complex completion is put forward as providing the *Arbeitsschule* with the required notion of psychological activity:

“Selz has shown that “reproductive thinking” is an extremely active process, a production process (*Arbeitsvorgang*). The important method, the important tool of this production process, is the scheme. In this scheme an unoccupied space (*Leerstelle*) takes the place of lacking thoughts, thoughts that have to be reproduced. The systematic completion of these unoccupied spaces of the scheme (the “determined change of complex”) leads to reproduction.”⁹

Rather than being a passive and mechanical process, Selz has taught, human memory turns out to be a systematic reconstructing of schematic anticipations and their gaps. It is this psychology of memory, Popper believes, that can help steer education away from the *Lernschule*, in which children are treated as empty buckets to be filled by the accumulation of knowledge, towards seeking children’s active engagement through thinking, without neglecting the role of memorisation in favour of the intellect. Selz’s cognitive psychology, as Popper sees it, is a natural psychological foundation for Burger’s pedagogical idea that education is the systematic development and perfection of teaching methods (“learning to learn,” what is called the *Kraftprinzip* in contrast with the *Stoffprinzip*).

In an earlier manuscript, his unpublished PhD thesis “Zur Methodenfrage der Denkpsychologie,” Popper also referred to Selz’s theory of problem solving but now in the context of the philosophy and psychology of science. Selz’s theory, he there claimed, was valid not only for the explanation of the individual (scientific) mind but also of science in the objective sense, as an ongoing sequence of competing theories.¹⁰ It is therefore time to have a brief look at Selz’s theory.

After his Ph.D Otto Selz (1881-1943) went to Bonn where he participated in the seminars of Külpe and Karl Bühler. Above all he was engaged in experimental investigations in the laboratory of Külpe. These investigations resulted in his first major work, his *Habilitationsschrift, Über die Gesetze des geordneten Denkverlaufs. Eine experimentelle Untersuchung*.¹¹ With his second major work in the psychology of thought, *Zur Psychologie des produktiven Denkens und des Irrtums*, its publication being postponed owing to the First World War, Selz’s intellectual prestige was incontestably on the increase, and in 1923 he was called for the chair of Philosophy, Psychology and Pedagogy at the *Handelshochschule* in Mannheim. In his scientific work Selz was increasingly marginalized owing to his unremitting criticism of colleagues but also to his formidable complex style of writing. A biologist disguised as psychologist, Selz came into conflict with proponents of the

Geisteswissenschaften, who blamed him for endorsing a mechanist view of man. Seeking to reconstruct psychological wholes on the basis of their elements, Gestalt psychologists considered him an atomist, whereas to the school of Krüger he was a one-sided rationalist. Closely allied to the Würzburg School he did not shrink back from launching frontal attacks on the ideas of some of its members. Aside from two pupils, Jules Bahle and Adriaan de Groot, he never founded a school and after 1933 his name disappears almost completely from the German psychological literature.

Although his experimental set-up was in the tradition of the Würzburgers, Selz's theoretical work deviates from the school in two respects. The first difference is that Selz does not even adopt a modified version of associationism but rejects it completely; indeed one of the tasks he set himself was to demonstrate the inadequacy of the most sophisticated form of associationism - the constellation theory - as an explanation of ordered thinking. The second difference is that in Selz's work the explanandum of psychology is shifted from the content of thinking to the process of thinking. While the elder members of the Würzburger School, above all Külpe, set themselves the phenomenological task of describing and analyzing thought experiences as a mental category *sui generis*, Selz, without denying the importance of so-called imageless thought, believes that the essence of thinking is to be found in a series of "operations" or "solving-methods." Complex completion on the basis of "schematic anticipations" is Selz's alternative theory of problem solving. In many cases of memory retrieval subjects already know that the information at hand is a piece of a larger whole or relational complex. Indeed, they even often know what kind of complex the piece belongs to. Being aware of this complex prompts the subject to anticipate schematically the answer to the question. Giving the example of a candidate in an oral examination trying to remember the *Melanchton*, and who is assisted by the examiner's giving the first three letters *Mel*, Selz explains: "The awareness of the word sought is changed from the awareness of an indetermined word to the awareness of a word beginning with *Mel*... We must think of it as though the empty scheme of a concrete word is partly filled out by the insertion at its beginning of the sounds spoken in anticipation..."¹² Diagrams of schematic anticipations making clearly visible that the awareness of a problem relates to the relational complex to be realized as the scheme of a complex relates to the completed complex appeared in Selz (1922, 1924)¹³.



Fig. 1 A schematic anticipation of a cognitive complex

In this diagram, γ might refer to the mental representation of a task or problem such as ‘find the co-ordinate of’ and A might refer to the representation of the stimulus word, e.g. ‘hunting’. Thinking, according to Selz, consists in integrating problem and stimulus so that a relational whole arises not unlike a mathematical equation with one unknown element. Schematic anticipations establish a system of tentative relations between the new elements and the relational complex they fit into. From this integration “determining tendencies” (*determinierende Tendenzen*) proceed which pave the way for a solution, which in Selz’s experiments, often amounted to filling in a gap as in figure 1.

Another important solving method is what Selz calls “trying-out behaviour” (*probierendes Verhaltens*). Trying-out behaviour is a general solving method applied by man and animal. It is different from blind trial-and-error. The most important difference is that with trying-out behaviour attempts at a solution are based on a partial insight into the situation. Always showing a clear sense of direction the organism tries out within a pre-set, goal-determined and limited domain of solution possibilities; in Selzian terms, schematic anticipations co-determine the where and what of search and trying. In figure 2, a variety of “trying-out movements” is depicted, a number of which will lead to a positive result (R) the others producing negative results ($N1, N2, N3 \dots$). In fact, at the right hand of the figure a symbol for a schematic anticipation should have been depicted.

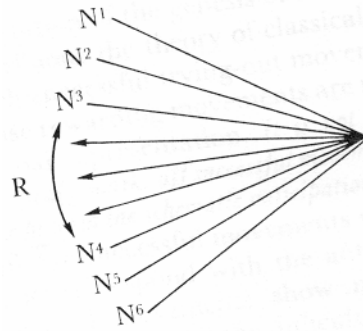


Fig. 2 Trying-out behaviour (after Selz 1924)

Selz's detailed and frontal assault on association psychology, and his defence of a theory of complex-completion, in fact boiled down to a view of the animal or human organism as an active cognitive subject constantly putting forward tentative proposals or hypotheses rather than as a passive recipient, patiently waiting for the accumulation of information to be inductively safe. Popper's theory of the searchlight differs only in matters of style from Selz's theory of schematic anticipations. After having incorporated Selz's quasi-deductive theory of problem solving, both as a theory of individual cognition and as a theory of science, Popper came to defend his deductive-empiricism in *Die beiden Grundprobleme* and his falsificationism in *Logic of Scientific Discovery*.¹⁴ In the next section, I argue that his defence of a world 3 equally draws on his early stance in psychology.

Problem solving and World 3

In "Epistemology without a Knowing Subject" Popper groups his defence of a pluralistic philosophy, supporting the idea of objective knowledge, around three theses. The first thesis is that traditional epistemology of the "belief-philosophers" Locke, Berkeley, Hume and Russell, is irrelevant to the study of objective scientific knowledge.¹⁵ His second thesis says that what is relevant for epistemology is the study of scientific problems and problem situations, of scientific discussions and arguments. These, Popper contends, are the inhabitants of a largely autonomous world 3. His third thesis says that an objectivist

epistemology contributes to a study of the subjective thought processes scientists are engaged in in their world 2, but “the converse is not true.”¹⁶

The existence of problems, arguments and the contents or ideas conveyed by language naturally has been recognized by the belief-philosophers, Popper concedes, yet, he hastens to add, they have usually been mistaken for subjective ideas belonging to world 2. This conflation is due to a reductive approach to language which Popper sees exemplified in almost the whole tradition of philosophy: “Strangely enough, the most important of the higher functions have been overlooked by almost all philosophers.”¹⁷ In an unpublished manuscript on the history of the theory of language it is above all the Bucket theory of Locke which is getting blasted: “Especially the “idea-psychologists” for whom there is nothing but idea-cum-association (perhaps also feelings) were never able to look further than (1) [the expressive function or its counterpart the inducing function]”¹⁸ The failure of such theories therefore is not simply their reductive view of language, but above all their mistaken subjective theory of mind, knowledge and truth. Indeed, this confusion and the attempt to clear it up is the core of Gottlob Frege’s work to whom Popper feels most indebted.

In his “Der Gedanke. Eine logische Untersuchung,” Frege seeks to prove that a thought is neither an object in the physical World nor an object in the mental World.¹⁹ His ontology of this latter world is built up exclusively of ideas (*Vorstellungen*) in the sense of British empiricism. However, far from rejecting this theory as inadequate in itself Frege investigates its logical features so as to make the difference between subjective ideas and thoughts in the objective sense absolutely sharp. Ideas, Frege explains, constitute the content of someone’s consciousness, are in need of a bearer, and the same idea cannot be shared by two bearers.²⁰ On the other hand, when two persons may recognize the truth of the same thought, for instance a Pythagorean axiom, this thought “does not belong to my consciousness, I am not its bearer and yet it can be acknowledged as true by me.”²¹ On the other hand, if it is not the same thought which is conceived by me and the other person as the content of the Pythagorean axiom, then one is really not allowed to speak of “the Pythagorean axiom,” but only of “my Pythagorean axiom” and “his Pythagorean axiom.” But in that case, Frege goes on, my thought belongs to the content of my consciousness and his thought to his, which means that the application of the words “true” and “false” is restricted to a private area of consciousness. Accordingly, there can be no science of thoughts common to many, but only private sciences, and hence no contradictions between the one private science and the other. As a kind of protecting shield against invading subjective mental processes Frege invents a “third realm” of existence, distinct from both physical reality and the mental world of private

experience, where thoughts are timelessly true, independent of whether someone takes them to be true. Precisely by assuming psychology (of knowledge) to be the science of subjective and private ideas Frege therefore, while explaining the tendency to mistake objective ideas (*Gedanken*) for subjective ones (*Vorstellungen*), at the same time succeeds in drawing categorical boundaries between psychology and logic. The other side of the coin is that by extruding thoughts from the mind Frege seems to deprive his theory of a means to apprehend thoughts. To be sure, Frege does speak of the process of grasping a thought, a kind of intellectual vision somewhat analogous to sense perception, yet thoughts being no contents of consciousness, there is not some impression of that thought mediating the process of understanding them. As Michael Dummett has put it, thoughts are presented directly to the mind, yet are not a content of the mind, and this clearly is inconsistent.²²

In spite of his appeal to Frege, Popper's own account of objective knowledge is quite different. Failing to recognize this difference, even though largely owing to his own formulations and examples, has been quite detrimental to the reception of Popper's ideas. For instance, taking world 3 analogous to "the myths and imagery of Judaeo-Christian theology," a metaphysical system bringing news of "mysterious realms and uncommon types of things," has led some to "demystify" Popper's claims. For instance, on David Bloor's view, much of what Popper says in terms of world 3 can be spelled out more plainly in terms of the social world and social processes.²³ Bloor's sociological reading has not been left unanswered, yet in general Popperians, although correctly accusing sociologists of making a travesty of the idea of objective knowledge, equally have failed to point out the differences between the more classical Fregean account and Popper's evolutionary approach to world 3.²⁴ But merely Popper's wholesale rejection of "idea-psychology" as a philosophical myth ought to be convincing proof of the differences between him and Frege. As he puts it in the manuscript on the history of the theory of language: "But that is really no tenable psychology: there are neither ideas (*Vorstellungen*) nor associations in our world of experience (including the unconscious)... The theory that these (very artificial) ideas are the elements from which all our intellectual experiences are built up is utter mythology."²⁵ It is not difficult to recognize in this passage the Bucket theory of mind. In what is obviously a preliminary sketch for his discussion of the Bucket theory in *Objective Knowledge*, Popper lists the main steps leading to the empiricist view of mind and knowledge, first attacked by him in its psychological version in his article on mnemonic exercise:

(1) Automatically we think of the mind (*die Psyche*) as a sort of content in our head; especially so when we take mind in the sense of knowledge.

(2) But this is of course a mistaken picture (metaphor).

(3) Thus we project our grammar in our skull (or mind) – for we know nothing about the actual processes in our intellect (*Verstand*).²⁶

Against this background, Popper might have concluded that even Frege, although correctly arguing for the objectivity of knowledge, precisely by assuming “idea-psychology” to be psychology, is in the grip of the mythology of the Bucket theory, and consequently that his arguments for the need of postulating a third (Platonic) realm ought to be seriously reassessed. Yet he never draws this conclusion. Instead, he puts forward an alternative and empirically realistic psychology of knowledge thereby at least suggesting to be interested in the process of understanding after all. As the first passage about the mythological picture goes on: “What does exist are (for instance) expectations; disappointed expectations; desires; ‘Aha!’-experiences...”²⁷ Expectations, as we have seen, are the core of the Searchlight theory as formulated by Popper in his article of 1948. In the article on mnemonic exercise of 1931 it turned out that Popper’s earliest conception of what he later calls expectations is the Selzian notion of schematic anticipation. But as the sequel to the above passage shows, rather than accurately tracing the course his ideas on the Searchlight theory have taken, Popper distorts the historical record and simply claims that the latter has arisen from projecting his ideas of World 3 to World 2:

(4) I too project my biological World 3 theory in our mind: but it is a slightly better theory. Example: I consider expectation the psychological correlate of knowledge (of a theory). Animals too have expectations; a theory is a World 3 form of [an] expectation.²⁸

As the preceding section has indicated, it is the psychology of expectations (Selzian schematic anticipations) which has been the blueprint for Popper’s epistemology of hypothesis formation. Like his methodology therefore, Popper’s objectivist epistemology is fraught with tension caused by his forced attempt to keep logic and psychology radically disjointed, and to

make use of *Denkpsychologie* at the same time. Unlike Frege whose concern with thoughts or the sense (Sinn) of an expression *eo ipso* meant holding aloof from any involvement with the process of grasping a sense, Popper is actually interested in the process of understanding, which significantly is interpreted by him as an active and creative process. Indeed, the most distinctive feature of his theory of objective knowledge is his attempt to explain world 3 as a product of human activity, thereby stripping the former of the divine status it acquired in Frege, and setting himself the task of explaining the process leading to this product. The key to this attempt to explain the objective world 3 as a product of human inventiveness is to enrich the ontology of the “third realm” with a category, which because of its very psychological connotation, would never have been allowed there by Frege, i.e. problems.²⁹ Thus the following frequently used scheme of problem solving, in which *P* stands for problem, *TS* for tentative solution and *EE* for error elimination, is conceived by him as entirely a World 3 process.

$$P_1 \rightarrow TS \rightarrow EE \rightarrow P_2$$

Figure 3 (after Popper 1972)

To be sure, there is a crucial difference between problem solving in the sense of a critical discussion among scientists about linguistically formulated problems, and the same process conceived as proceeding in the scientist’s (unconscious) mind, yet it is the psychology of discovery which has provided Popper with a blueprint for the former. Indeed, the above scheme is virtually the same as Selz’s original diagram of trying-out behaviour (figure 2), and hence Popper’s theory of the Searchlight. Even what is new about the above scheme, the notion of *P*₂, as we will see in due course, traces back to Selz’s (and Wundt’s) psychology. With a category of world 3 objects so much dependent on the notion of a psychological process therefore, how can Popper live up to an epistemology “without a knowing subject”? At this point the importance of the distinction between the Bucket theory and the Searchlight theory becomes again pivotally important. Despite their being both psychological theories Popper, at crucial places, never deals with them symmetrically in this respect. On the contrary, when arguing against psychologism, and insisting upon a categorical distinction between world 2 and world 3, psychology is almost exclusively taken by him in the sense of the Bucket theory. For instance, when discussing the activity of understanding objective

problems, Popper points out that we always have to describe world 3 objects of problem solving and that the subjective processes, such as feelings of excitement or disappointment, world 2 components, have no bearing whatsoever on the problems discussed. On the other hand, explaining world 3 as a product of the human mind, and maintaining that an objective analysis of problems is at the same time “an analysis of what we are doing in our subjective world when we try to understand,” he clearly relies on the Searchlight theory of mind, which is then explicitly advertised as a biological or evolutionary theory.

It is his Selzian background in *Denkpsychologie* which explains why Popper feels so confident in saying that his analysis of problem solving as a world 3 process is at the same time an analysis of problem solving as a world 2 process, since it was originally conceived as a world 2 process. Yet given the formidable degree of abstraction of Selz’s psychological theory – abstraction from the judging person – it in fact approaches a logical or world 3 description of problem solving, providing almost no insight into the working of particular acts of thinking of a particular scientist at a particular time. In Selz it is left unclear what causes the process of thinking, a “task-dynamic” theory, one according to which the sole moving principle of mental processes must reside in the problem, being in fact what he proposed.

Thus fluctuating between being a psychological and a logical theory of problem solving, Selz’s theory turned out to be the best of both worlds for Popper: a theory of world 2 cast in terms of world 3 processes, or a theory of world 3 assumed to be valid also for what happens in world 2. No other psychological theory therefore could equal Selz’s in also serving as a theory of objective knowledge, of an “epistemology without a knowing subject.” Indeed, for several reasons Popper’s attempt to supplement his early psychology of knowledge or *Denkpsychologie* with a theory of objective knowledge appears quite natural from the perspective of the program of Selz and Bühler. For one thing, the crucial idea of the theory of world 3 that knowledge is inescapably conjectural rather than (potentially) certain, occurred to Popper after incorporating Selz’s theory of trying-out behaviour. For another, the likewise crucial idea of knowledge as an intersubjective and criticizable notion, rather than a subjective phenomenon in the mind, is almost a corollary of Bühler’s and Selz’s finding that (linguistically formulated) problems or tasks are the vehicle of thinking. A third idea, not discussed so far, concerns the autonomy of problems. This idea too, at least so I will argue, is rooted in early German psychology, especially Selz’s psychology of scientific discovery and Wundt’s *Volkerpsychologie*.

Although the idea of the autonomy of problems occurs in Popper’s work not until the 1960s it has its ancestry in an earlier article defending a rationalistic view of scientific tradition.

Written in the same period in which the essay on the Bucket and the Searchlight theory first appeared, he conceives of scientific tradition as a searchlight pointing the direction to future research, owing to its heritage of specific solving-methods. Thus acknowledging the importance of tradition in explaining the growth of scientific knowledge, is reminiscent of Selz's biologized version of the concept of (scientific) tradition and its role in mediating problems and their solutions. Just as behavioural responses of the individual become automated due to continually repeated experiences, Selz maintained, the growth of science is enormously helped by the heritage of specific solving-methods interiorized, as it were, in the unconscious mind of the scientific species, thereby avoiding the need to re-invent the wheel and hence explaining the difference between the human animal and all the other animals.³⁰ Important to note is that Selz not only proposes to investigate the role of chance in the genesis of ideas of individual scientists, but also in the genesis of the "objective development," or products, of art and science, thereby taking his cue from Wundt's *Völkerpsychologie*. In his view the role of problems is sometimes even more clearly traceable in the objective than in subjective development of art and science.³¹

When Popper maintains that in giving an historical account of the creative development of science, problems rather than the discoverer's personal inclinations and emotions are what matters, he in fact continues the course initiated by Wundt's *Völkerpsychologie* and elaborated upon by Selz. It is also in this context of objective knowledge that Selz discusses a further role of chance, which clearly foreshadows Popper's later view of the autonomy of problems. Besides its role in providing the artist or scientist with new means to approach or solve his problem, Selz explains, the unintended yet valuable effects prompted by chance may also consist of setting oneself a new goal, one focused upon intentionally fabricating the initially unintended effect.³² Taking his cue from Wundt's *Völkerpsychologie*, Selz points out that the development of the objective products of art, more than the subjective genesis of ideas of individual artists, is often explained by the occurrence of initially unintended, hence coincidental, aesthetic effects. Thus Dutch landscape painting has arisen in three stages: as a background to historical and religious themes, as a historically decorated landscape and finally as a pure landscape, hence "...in order to be discovered and gradually become an object of independent artistic endeavour the emotive value first had to occur as a side-effect of historical representations."³³ The objective development of the arts, Selz concludes, confirms the creative role of chance first postulated in the area of *Denkpsychologie*.

The third crucial aspect of Popper's theory of objective knowledge, the idea that world 3 objects, although products of the human mind, are also autonomous, existing independently of

anybody's awareness of them, seems to be a philosophical consequence he draws from Selz's and Wundt's theory of the role of unintended effects. The point needs emphasizing, since it is sometimes said that he owes his theory of intended effects to Friedrich Hayek, who in his article "Scientism and the Study of Society" (1942) and the essay "The Results of Human Action but not of Human Design," uses the notion to account for a non-Cartesian theory of the social world.³⁴ In the latter essay, Hayek notes that Popper would have adopted his theory in *The Poverty of Historicism* and *The Open Society and its Enemies*.³⁵ But as Popper retorts, he wrote *The Poverty of Historicism* before the publication of Hayek's first article on the subject.³⁶ Popper's reading of Selz's (1922, 1924) elaborations of Wundt's *Völkerpsychologie* seems to support his claim not to have adopted the theory from Hayek.³⁷

Concluding remarks

Whereas Popper uses the theory of unintended effects in his two earlier works especially in the context of social and political philosophy, the emphasis is shifted towards problem solving in his theory of mind. Indeed, what he calls autonomy is explained by him in terms of the unintended consequences of problem solving. Thus in the visual arts, Popper illustrates his idea, a painter may put a speck of paint on the canvas and look at the effect and evaluate it. The effect may be intended or unintended, and if the latter he may correct or remove it, but it "may also suggest to him a new idea: it may suggest to him, for example, a new balance of colours, more striking than the one originally aimed at...far transcending his starting point."³⁸ In his ability not only to perpetuate himself but to deliberately and self-consciously memorialize himself, to leave his mark on the world for posterity, to create a world outside himself, a world of art and music, a world of philosophical thought, a world of science, a world of artificial objects, man differs from other animals. It is because of this transcendence that Popper talks about a "third world". This idea of transcendence goes back to his supervisor Karl Bühler, who in his *Die Krise der Psychologie* (1927) defended a theoretical pluralism in psychology encompassing the aspects of "lived experience," of "behaviour" and of the "objective products of the human mind".³⁹ One of Popper's aims in his dissertation "Zur Methodenfrage der Denkpsychologie" was to defend Bühlerian theoretical pluralism in

psychology against the reductive proposals of Moritz Schlick and Wolfgang Köhler. Like Bühler's view of psychology, Popper's view of knowledge is Janus-faced, incorporating both biology and the world of ideas and values. But it is Selz's theory which provided him with a model of how in particular science achieves this transcendence.

¹ Popper, *Objective Knowledge*, (Oxford: the Clarendon Press, 1972), p. 106.

² Michel ter Hark, *Popper, Otto Selz and the Rise of Evolutionary Epistemology* (Cambridge: Cambridge University Press, 2004). Karl Popper, *Die beiden Grundprobleme der Erkenntnistheorie* [1930-33]. Edited by Troels Eggers Hansen. Tübingen: J.C.B. Mohr, 1979.
Popper, *Logik der Forschung: Zur Erkenntnistheorie der moderne Naturwissenschaft*. Vienna: Julius Springer, 1935. (*The Logic of Scientific Discovery*, London: Hutchinson, 1959.)

³ Karl Popper, "Naturgesetze und Theoretische Systeme," in *Gesetz und Wirklichkeit*, ed. Simon Moser (Wien: Europäisches Forum, 1949), pp. 43-61. Translated by Popper as "The Bucket and the Searchlight: Two Theories of Knowledge," in his *Objective Knowledge*, pp. 341-362.

⁴ Popper, *All Life is Problem Solving* (London: Routledge 1999), p. 53.

⁵ Popper, 'Die Gedächtnispflege unter dem Gesichtspunkt der Selbsttätigkeit' *Die Quelle* 81 (1931): 607-619.

⁶ *Ibid.*, p. 610.

⁷ Ibid., p. 613.

⁸ Ibid., p. 613.

⁹ Ibid., p. 616.

¹⁰ See ter Hark 2004, chapter 5. Popper, “Zur Methodenfrage der Denkpsychologie,” Ph.D. diss., University of Vienna, 1928.

¹¹ Otto Selz, *Über die Gesetze des geordneten Denkverlaufs* (Stuttgart: Verlag von W. Spemann 1913). Selz, *Zur Psychologie des produktiven Denkens und des Irrtums* (Bonn: Verlag von Friedrich Cohen 1922).

¹² Selz 1913, p. 114.

¹³ Selz, *Die Gesetze der produktiven und reproduktiven Geistestätigkeit. Kurzgefasste Darstellung* (Bonn: Bouvier Verlag 1924). Reprint 1981. (“The Laws of Cognitive Activity, Productive and Reproductive: A Condensed Version.” In *Otto Selz: his Contribution to Psychology*, edited by Nico Frijda & Adriaan de Groot. (The Hague: Mouton 1980).

¹⁴ See for the details of this transition ter Hark 2004, chapter 4 and 5.

¹⁵ Popper, ‘Epistemology without a knowing subject’ in his *Objective Knowledge*.

¹⁶ Ibid., p. 112.

¹⁷ Ibid., p. 120.

¹⁸ Popper, “Bemerkungen über Sprachtheorie und ihre Geschichte”, Hoover Instiute Archives, Karl Popper Papers, box 4, file 8, p. 1.

¹⁹ Gottlob Frege, “Der Gedanke. Eine logische Untersuchung,” *Beitrage zur Philosophie des deutschen Idealismus* 2 (1918-1919): 58-77. Reprinted in Gottlob Frege, *Logische Untersuchungen*. (Göttingen: Vandenhoeck & Ruprecht, 1986), pp. 30-54. Edited by Günther Patzig.

²⁰ Ibid., pp. 41-42.

²¹ Ibid., p. 42.

²² Michael Dummett, *Origins of Analytical Philosophy* (London: Duckworth, 1993), p. 136.

²³ Bloor, D., "Popper's Mystification of Objective Knowledge", *Science Studies* 4 (1974): 65-76; Bloor, D., *Knowledge and Social Imagery*. London 1976.

²⁴ See for instance J.W. Grove, "Popper "Demystified": The Curious Ideas of Bloor (and Some Others) about World 3," *Philosophy of the Social Sciences* 10 (1980): 173-180.

²⁵ Popper, "Bemerkungen über Sprachtheorie und ihre Geschichte", p. 4.

²⁶ Popper, "Bemerkungen über Sprachtheorie und ihre Geschichte", p. 5.

²⁷ Ibid., p. 4.

²⁸ Popper, "Bemerkungen über Sprachtheorie und ihre Geschichte", p. 5.

²⁹ At only one occasion Popper relates the notion of problems to the tradition from which he actually takes it, i.e. the Würzburger psychology of Bühler and Selz. See Popper, *Unended Quest*, (London: Routledge 1974), p. 76.

³⁰ As Popper puts this point: "If we start afresh, then, when we die, we shall be about as far as Adam and Eve were when they died (or, if you prefer, as far as Neanderthal man)" (*Conjectures and Refutations*, London: Routledge & Kegan Paul 1963, p. 129).

³¹ See Otto Selz, *Zur Psychologie des produktiven Denkens und des Irrtums*, pp. 686-688.

³² See Selz, *Die Gesetze der produktiven und reproduktiven Geistestätigkeit. Kurzgefasste Darstellung*, p. 58ff; Selz, *Zur Psychologie des produktiven Denkens und des Irrtums*, p. 685ff.

³³ Selz, *Kurzgefasste Darstellung*, p. 59.

³⁴ Friedrich Hayek, “Scientism and the Study of Society, I.” *Economia* 9 (1942): 267-91.
Reprinted in his *The Counter-Revolution of Science* (Glencoe, IL: The Free Press, 1952);
“The Results of Human Action but not of Human Design,” in his *Studies in Philosophy,
Politics and Economics*. Chicago: University of Chicago Press, 1967, chapter 6.

³⁵ Hayek, *Studies in Philosophy, Politics and Economics*, p. 100, note 12.

³⁶ Popper, *Objective Knowledge*, p. 160, note 9. According to Bruce Caldwell, the major
impact of Hayek had on *The Poverty of Historicism* is in causing Popper to change the
manner of presentation of especially the last two chapters (“Popper and Hayek: Who
Influenced Whom?” unpublished). See also his “Hayek the Falsificationist? A Refutation,”
Research in the History of Economic Thought and Methodology 10 (1992): 1-15.

³⁷ It is even possible that Hayek has been influenced by German psychology. In the Preface of
his *The Sensory Order. An Inquiry into the Foundations of Theoretical Psychology* (London:
Routledge & Kegan Paul), he tells us that his ideas on theoretical psychology trace back to the
psychology he read in Vienna in the early 1920s. Although Selz is not mentioned, Wundt is.

³⁸ Popper 1994, p. 31.

³⁹ Karl Bühler, *Die Krise der Psychologie* (Jena: Gustav Fischer, 1927).