

IN MEMORIAM

Gaetano Kanizsa (1913-1993) - Things and perceptions

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Gaetano Kanizsa, died on March 13, 1993. He used to say: "I'm not a psychologist, I'm a 'thingologist'". By this expression, he meant: I do not study psychological constructs (ideas, acts, cognitions) - neither perception, in a certain sense. The object of my research are "things" (le cose), as they stand directly in front of the perceiver. Together with Edwin Rauschand Rudolph Arnheim he was one of the last great Gestalt psychologists. Gaetano Kanizsa was a typical representative of the cultural milieu of the geographical area which is nowadays fashionable to call Mitteleuropa. He was born on August 18, 1913, when Trieste still belonged to the Austro-Hungarian empire, and he embodied many features of the empire and of the unique cultural atmosphere which pervaded it in those years. His father was a Hungarian Jew from Nagybecskerek, known today as Zrenjanin, in Banat. When he arrived in Trieste, the city where his children were to be born, he spoke German or, with some difficulty, the Trieste dialect to his wife, a Slovene from the Bovec area, near Kobarid. Sigismondo, Gaetano's younger brother, who died about fifteen years ago, was also born in Trieste. He was a very practical person and a skilled glass-maker who greatly admired the profession of his brother, and often assisted him in practical matters. Before university, Kanizsa was not a brilliant pupil. He attended a classical secondary school in Trieste. He used to remark (as Fabio Metelli would always point out) how intelligence and creativity are often disregarded in the schooling system; despite this, he was able to complete his secondary education successfully. At the time, there was no University in Trieste, so he studied Philosophy at Padua University, where Cesare Musatti introduced him to psychology. In those days there were already strong connections between Trieste psychologists and Padua University; the Venetian Musatti had been introduced to psychology by the Trieste-born Benussi, and the mentioned Fabio Metelli, also from Trieste, was been Musatti's

student only few years before Kanizsa. It is worth to note that Benussi was a student of Meinong, the leader of the so-called Graz school, as well as Mihajlo Rostohar and Ramiro Bujas, founders of Ljubljana and Zagreb psychological schools, respectively. This fact can also demonstrate how deep are the common roots of psychology in this European area. Musatti, after the death of Benussi, had turned to Gestalttheorie, and was the first Italian Gestalt Psychologist.

Gaetano Kanizsa graduated in 1938, with a thesis in psychology on eidetic imagery in Jaensch's theory. The events which led him to choose this subject for his thesis are worthy of mention: Kanizsa, whose family was not wealthy, had to work to live during studying, and, after teaching at a primary school in the heart of Istra, had managed to find a one-year temporary teaching position at Conegliano secondary school, thanks to Musatti. The Conegliano area was said to have waters that favoured the formation of eidetic imagery, so his mentor, with a touch of irony, suggested him to research the phenomenon while he was there. Kanizsa's investigation was far more serious than its premises might lead to conceive, so much so that after his graduation his thesis was published (Kanizsa, 1938).

Unfortunately, the historical and political events of the times were to catch up with him and Kanizsa was forced to stop teaching because of the racial laws, as well as his professor Musatti. Kanizsa was then deprived of his Italian citizenship as well, and interned in a little village near Udine, Buttrio, from where he escaped in 1943, went Rome and joined the Resistance. A well-known psychometrist, Luigi Meschieri, supported him in Rome, by swindling bureaucracy at his own personal risk, so Kanizsa was appointed as a researcher at the Institute of Psychology of the C.N.R. (National Council for Research). There he devoted himself to the study of tachistoscopic perception (Kanizsa and Meschieri, 1950). He also worked in the field of applied psychology, particularly aptitude test-

ing; for instance, he prepared the Italian version of the Terman-Merrill scale (Kanizsa, 1950).

After the war, he was asked by Musatti to join him at the Psychology Laboratory of the firm Olivetti in Ivrea, where he worked till 1947. It is worth recalling that Adriano Olivetti had wanted a number of intellectuals working for his company (Volponi and Ottieri, distinguished Italian novelists, among others), since he believed, in his utopic view of the relations between society and industry, that intellectuals could greatly contribute to industry even though they have a non-industrial background. Kanizsa strongly believed in social commitment; he promoted the organisation of the *Rinascita* boarding schools, an extraordinary educational institution of the early post-war years for the children and orphans of partisans - he appointed Giulio Petter, his very first student, as a head of the Milan *Rinascita* school - he was later succeeded by Giuseppe Mosconi. Both Petter and Mosconi are today very distinguished Italian experimental psychologists; the former introduced in Italy Piaget's theory; the latter does research on reasoning and problem solving. In *Rinascita* school Kanizsa introduced a pioneering activity of counseling (Kanizsa, 1948).

In 1947 Kanizsa was appointed as assistant professor at Florence University (Metelli was Chairman of the Department of Psychology at the time) and later he became Musatti's assistant at Milan University. While in Florence, Kanizsa published a number of papers of high scientific quality; among them, a paper on intermittent stimulation of the retina (Kanizsa, 1951c), and, in particular, the paper on the polarisation of gamma movement, the apparent expansion of an object which is abruptly presented in a homogeneous field (Kanizsa, 1951b), now a classic study which has recently been revived internationally. In this research he demonstrated that the gamma movement, usually centrifugal, could be polarized in the direction when the homogeneous field is structured.

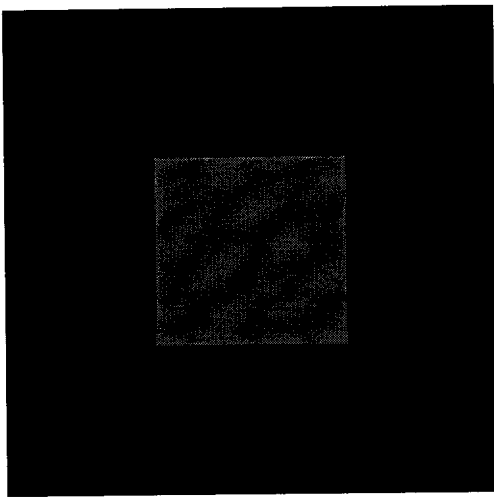
At this time Kanizsa's theoretical beliefs had gradually turned to the Gestalttheorie (their professor, Musatti, had to some extent distanced himself from the Gestalt ideas, and moreover, he was mainly involved in psychoanalytic practicing and theorizing). His focus of scientific interest was almost entirely the study of visual perception. In 1952 Kanizsa was involved in a famous controversy with Father Agostino Gemelli, founder of the Catholic University of Milan, and one of the "fathers" of the Italian experimental psychology, regarding the legitimacy of dividing perception into stages, an idea which Gemelli supported being a follower of both Sander's post-Wundtian school of Leipzig and Neo-Thomistic theories - it is worth to note that Gemelli nevertheless held in high esteem his young defiant in-

terlocutor. Even today, at a time when the Human Information Processing paradigm is still highly influential, it would be extremely instructive to read anew the article where Kanizsa (1952) attacked Gemelli's stance on the subject (Gemelli's reply had an exceptionally mild tone given his usual intolerance). Also dating back to his Milan period is the research on the "Musatti effect", in which he showed an important paradox related to chromatic induction (Kanizsa, 1954b), and those on contour gradients (Kanizsa, 1954a). The paradox, that is yet puzzling to scholars of perception, is shown in Figure 1: by simultaneous contrast the grey square in A appears lighter than the one in B; and for assimilation (Musatti's effect), the grey square in D appears lighter than the grey square in C. But the lightness of A and C appear equal, as well as the ones in B and D.

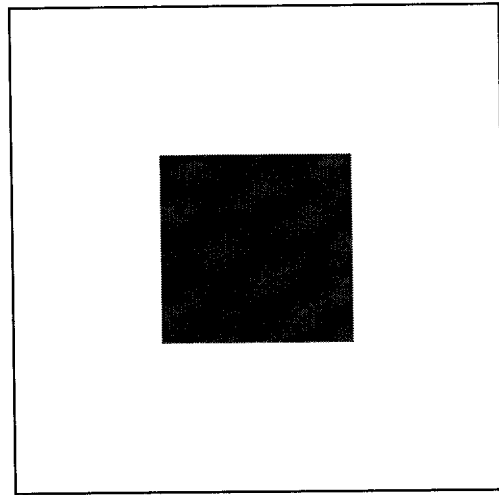
The effect of contour gradients are shown in Figure 2. One can see that when one shape has not a sharp contour, but a contour gradient, as in B, its colour does not appear a "surface colour", but as a shadow superimposing the surface, somehow lighter than the surface colours.

Kanizsa did not neglect other areas of research, although his main interest was always focussed on visual perception. He published an interesting article on attention based on Toulouse Piron's test (Kanizsa, 1951a). It was followed, in 1953, by two important experimental papers, one on aggression and frustration (Kanizsa, 1953a - see also Kanizsa, 1955c) and the other one - internationally famous and even quoted by Rohrer in his celebrated treatise on Characterology - on psychodiagnosis or rather, on the possible errors in the validation of psychodiagnostic instruments (Kanizsa, 1953b). He showed that subjects who had randomly assigned personality diagnoses on the basis of mock tests tended to accept them anyway. His general interest in the human mind and his great curiosity in the motivation that leads people to behave often in unexpected ways are evident in this area of research.

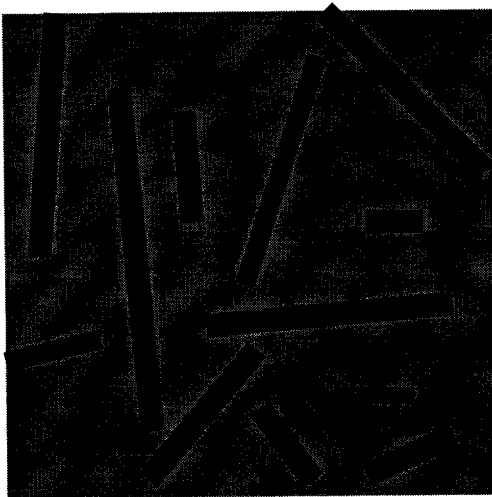
In 1953 Kanizsa was appointed as full professor of Psychology at Trieste University and he founded the Institute of Psychology (today, Department). Another professor from Trieste, Ferruccio Banissoni, had preceded him in the Faculty which had been founded only ten years earlier. Banissoni had been the first psychologist at the University of Trieste; however, being an applied psychologist, he has never been involved in any experimental research, which had to be Kanizsa's achievement. Kanizsa was never to leave Trieste; he stayed there till 1988, the year of his retirement. In 1983, when he retired from teaching, he was celebrated by all the exponents of Italian psychology in a memorable conference held in Trieste. A "Festschrift" followed



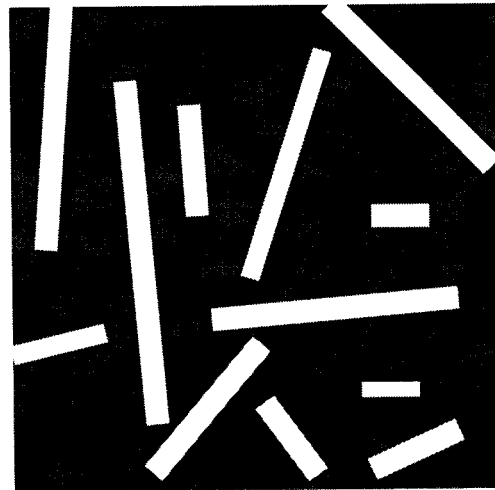
A



B

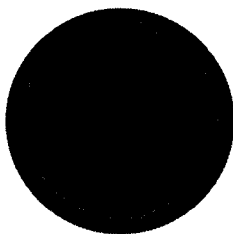


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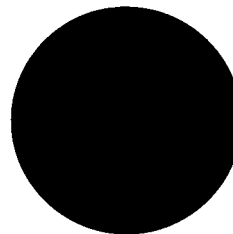


D

Figure 1. Simultaneous contrast (squares A and B) and Musatti's effect (squares C and D)



A



B

Figure 2. The effect of contour gradients

the conference; it has been edited by Gerbino and contained contributions by some of the most eminent Italian scholars even in fields other than perceptology. After his retirement Kanizsa was nominated as professor emeritus and continued his intensive research activity until the day he died.

The time he spent in Trieste is undoubtedly his most successful period in terms of research. A continuity may be noted between the research he carried out in Milan, as Musatti's assistant, and that performed in the early Trieste years. In particular, Kanizsa's attention was focussed on two closely related issues. The first concerns the modifications in the phenomenal qualities of colour brought about by various figural factors; relations among the parts, characteristics of contour gradients, colour assimilation versus colour contrast (Kanizsa, 1957, 1960). The second issue, which he owed his international fame to, regards "quasi-perceptual contours" (as Kanizsa, 1955a, called it at that time) or anomalous figures (as Kanizsa, 1976a, preferred to call it after the 70s). The famous triangle (Figure 3) with quasi-perceptual contours (the very first name was actually "phenomenal contours in absence of discontinuity of stimulation") was presented for the first time at the 10th Conference of Italian Psychologists in Chianciano (Kanizsa, 1954c). In the following years Kanizsa studied these issues in depth in a number of researches. The first favourite explanation of this phenomenon was in terms of amodal completion (see below).

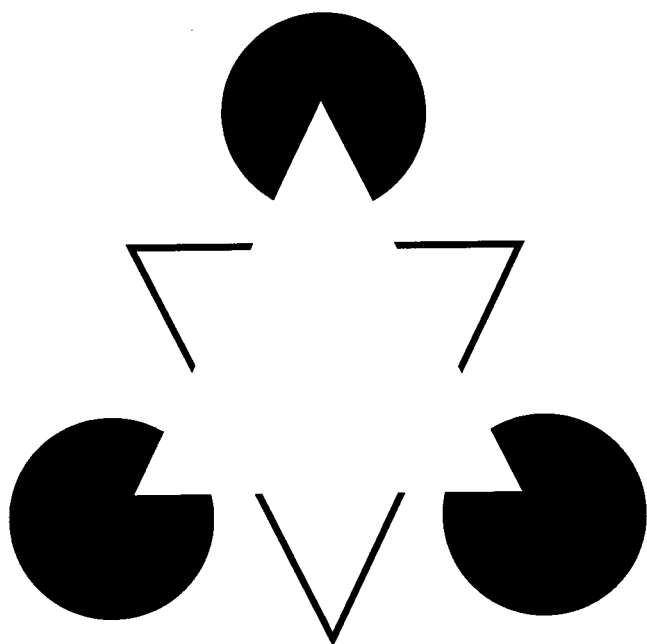


Figure 3. Kanizsa triangle

In 1955 he turned to another issue which has later been developed mostly by Metelli; phenomenal transparency (Kanizsa, 1955b). Kanizsa's qualitative observations have been followed by Metelli's algebraic approach, which was first presented in Salonica in 1969. Kanizsa had gained international recognition for these studies, to the extent that Wolfgang Metzger, who held him in high esteem and affectionately used to call him "Spitzenbube" (rascal) for the irreverent ardour with which he would turn to any matter that stimulated his curiosity, asked him to write a chapter on colour phenomenology in his monumental treatise on psychology, even though Kanizsa, unlike the other authors, did not speak German as a native-tongue (Kanizsa, 1966).

Kanizsa had, in effect, become the centre of Italian research on perception, both as a promoter of experimental activity and as a theoretical reference point. His ideas often acted as a catalyst of important scientific debates. Here we shall only recall the memorable symposium on the methodological aspects of perception held in Palermo, within the 13th Conference of Italian Psychologists. Its records, which are to this day a landmark for all researchers, include an important contribution by Kanizsa - who disliked merely theoretical presentations - on the delimitation of the scope of perception: "If the word 'perception' has come to acquire meanings so heterogenous as to allow its use in two diverse contexts such as 'perception of a red square' and 'perception of the world', we may as well abandon it..." (Kanizsa, 1961).

In the same period he investigated two other areas both related to perception. The first, concerning casual connections, was initiated in the wake of Michotte's papers and researched together with Metelli (Kanizsa and Metelli, 1956, 1961) and Vicario (Kanizsa and Vicario, 1967); the time of these research could be recalled as one of the happiest in his life, as he wrote in the preface to his last book "Vedere e Pensare" (1991). The second area of research, which lead him into mild controversy with his master, Musatti, regarded the weight of empirical factors on perceptual organization. Although Kanizsa (1968, 1969), who still supported the Gestalt theories at the time, did not a priori deny the possibility of influence of past experience on perception, he continued to produce beautiful demonstrations, even aesthetically so, of the absolute predominance of autochthonous factors, as he liked to call structural elements, and showed a specific ability in taking apart any empiricist argumentation. A "Festschrift" published by Trieste University in honour of Musatti's 70th birthday bears testimony to this controversy (Kanizsa and Vicario, 1968). The volume contains contributions by the members of what had then become the Trieste school ; in particular, we would like to mention Tampieri, Vicario and Minguzzi. We would

also like to recall that Paolo Bozzi, though not a direct contributor to this publication, had taken part in the research carried out at the Trieste Department for ten years. Towards the end of the 60s a relatively new area of research - foreshadowed, however, by the original explanations of anomalous figures - became prominent; amodal completion and its related dimensional effects. Contraction and, under certain circumstances, expansion brought about by amodal completion were first presented in 1972 and 1978, respectively (Kanizsa, 1972; Kanizsa and Luccio, 1978). As one can easily see in Figure 4, in A the rectangle $abcd$ appears smaller of

the physically equal $a'b'c'd'$, while in B the parallelogram $abcd$ appears greater than $a'b'c'd'$. Kanizsa's interpretation of the phenomena was related to the "principle of the minimum" as formulated by Koffka.

Even in this case, his research was prompted by a curious incident. Trieste psychologists used to meet, whenever possible, in a wine bar close to the Department, the "Collio", where, around a carafe of local wine, they would heatedly discuss themes related to perception. This bar, so typical of Trieste, had big rectangular wooden panels on the walls, with the clothespegs on them. Kanizsa noticed that the surface of the

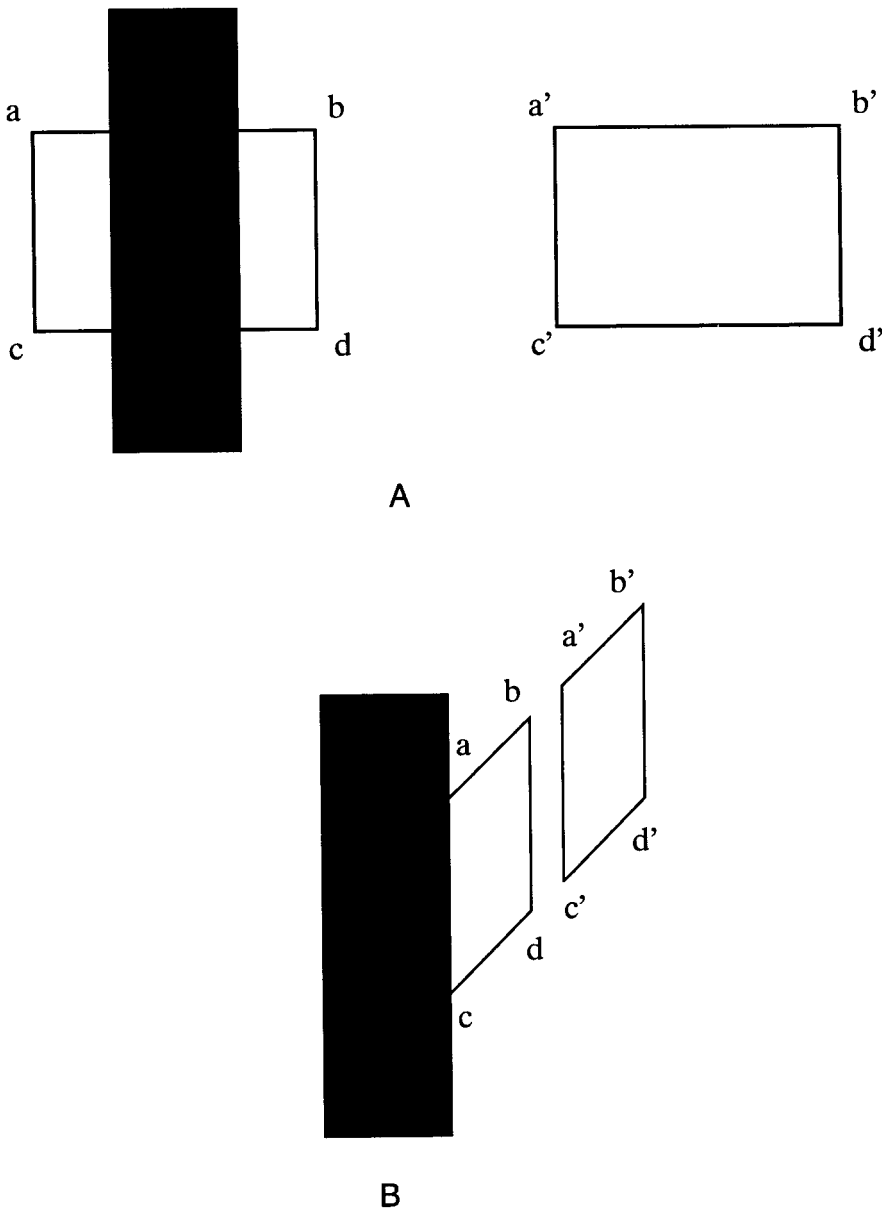


Figure 4. Examples of illusion of size

panels with the coats hanging seemed to be markedly contracted when compared to those whose surface was clear. As usually Kanizsa's research was stimulated by careful observation of the objects and people around him. Kanizsa and his students have carried out a number of research on this topic in the '70s and '80s (for instance, Kanizsa, 1975; Kanizsa and Gerbino, 1982; Kanizsa and Massironi, 1989).

In 1970, Gregory rediscovered the famous "triangle". He republished it and offered an empiricist explanation for it which Kanizsa could not help rebelling against. This event marked the beginning of his international fame. In 1976 he wrote an article on anomalous surfaces in "Scientific American", which was internationally acclaimed. The "triangle", however, became the most widely studied perceptual phenomenon of the last two decades; throughout the world hundreds of articles have been written, conferences especially organized and heated debates hold on this subject. In 1987, Kanizsa saw with great pleasure that his article dated 1955, had been translated into English. His article, together with the classic studies by Schumann and Ehrenstein, is one of the first in the volume edited by Petry and Meyer on "illusory contours" (the name they chose for anomalous contours). The collection of papers bears testimony to the massive amount of research carried out in the 70s and 80s on the "triangle". The translation gave Kanizsa the opportunity to reconsider the thesis put forward in the paper 30 years after its elaboration; in the broader context of a general re-assessment of the role of Pragnanz in mental activity, he no longer considered the tendency towards regularization as a constituent factor in perception.

In the same volume Kanizsa published an original article in collaboration with Walter Gerbino, on the energetic/informational dichotomy in explaining anomalous figures. Even today new papers are being published every month which investigate the properties of the phenomenon, seek to establish its conditions, study its neurophysiological correlates, verify its occurrence at different onto/phylogenetic developmental stages and suggest new theoretical interpretations for it.

Kanizsa's fame had already been sanctioned in 1979 with the book "Organization in Vision", a collection of his most important articles. The book was even translated into Japanese by Kaoru Noguchi. It should be noted that in Japan, a country where research on perception is highly advanced, Kanizsa is considered a legend, as we were recently told by some of our Japanese colleagues. The Trieste University Department of Psychology has often invited Japanese colleagues, who saw the opportunity of working with Kanizsa as a unique event in their scientific careers.

In the meantime, far from isolating himself in an old-style Gestalt dogmatism, Kanizsa started reconsidering his theoretical point of view, showing both a great mental flexibility and an openness towards the ideas of his younger colleagues. His explicit statement of the need to distinguish between perceptual and thought processes, contained in a paper written for "Acta Psychologica" in 1985, is directly connected to a number of papers dating from the 70s in which he identified differences between autochthonous perceptual features and features which are typical for thought phenomena, and are wrongly attributed to perception (e.g., Kanizsa, 1975a, 1975b). Along the same lines it is worth mentioning another article on "the Gestaltist's error" which foreshadowed a more detailed analysis (Kanizsa, 1970). The differences between seeing and thinking were first demonstrated in 1975, in a paper on the segregation of overlapping figures (Kanizsa, 1975d), and later in three articles written in collaboration with Gerbino. The first, dated 1976, regarded figure-ground articulation, the second, written in 1982, was about completion and the third, dated 1985, concerned amodal perception. The original article written as a preface to "Organization in Vision" and which became a classic, regarded the "two ways of going beyond given information" and contained the main theoretical idea which characterized the last 15 years of his scientific activity; the distinction between a "primary process", which is typically perceptual and responsible for the "articulation of the field into separate units", and a "secondary process", which implies higher cognitive activities responsible for recognizing, classifying and attributing the meaning. Kanizsa thus broke off from Gestalt orthodoxy although he would always feel tied to their tradition. Above all, the dogma which held that vision and thought processes were inseparable was challenged. The research carried out with Luccio as from 1984 on Pragnanz is highly significant for this issue (Kanizsa and Luccio, 1986). A fundamental ambiguity was detected in Gestaltists' assertion of this principle: there was an uncertainty between the notions of "singularity" and "dimensionality", between Pragnanz seen as a process or as a phenomenal quality. A tendency towards perceptual stability was being asserted, while denying one towards the formation of "good" shapes. This theoretical standpoint prompted strong reactions from both, the most orthodox Gestaltists, such as Arnheim and Zoltobrocki, and the Constructionists, such as Stadler and Kruse. Their reaction was nevertheless accompanied by appreciation; in 1986 the Gesellschaft für Gestalttheorie honoured him (together with R. Luccio) with the "Wolfgang Metzger award" for "ausserhordentliche Verdienste um die Förderung gestalttheoretischer Forschung" (exceptional contribu-

tions to the progress of research on Gestalt theory). This line of theory was later developed through research on "Hoffding's step" (Kanizsa and Luccio, 1987), on self-organization (Kanizsa and Luccio, 1990, 1993) and on apparent motion (Kanizsa, Kruse, Luccio, and Stadler, 1994), bringing his theory close to H. Haken's synergetics. Kanizsa's last research, carried out with Luccio (Kanizsa and Luccio, 1995), was along the same lines; an investigation into multistability on the basis of experiments on stroboscopic alternatives and figure-ground inversion, which presented situations of sudden radical reorganization of the perceptual field brought about by motion.

On March 13, on a train journey back to Trieste from a meeting with other colleagues held in Bologna, Kanizsa finished working over the final draft of the paper on the above topics, which was to be presented at a meeting in Bremen. Soon after midnight he suffered the heart attack which was taken his life, without even giving him the time to realize what was happening. The Bremen meeting was entitled by the organisers Stadler and Kruse "in memoriam Gaetano Kanizsa".

During the years of his outstanding experimental and theoretical activity Kanizsa investigated a large number of other areas of research such as retinal orientation (Kanizsa, and Tampieri, 1968, 1976), perception of numerosity (Kanizsa and Luccio, 1981a, 1981b), contrast (Kanizsa and Minguzzi, 1984a, 1984b), painting and perception (Kanizsa, 1988a), animal perception (Kanizsa, Renzi, Conte, Compostela, and Guerani, 1993), and problem-solving (Kanizsa, and Grubissa, 1976). Moreover, he made contributions to the philosophy of psychology and redefined the Gestalt theories and the tenets of experimental phenomenology (Kanizsa, 1970b, 1978, 1988b, 1995). His experimental work also includes a paper on visual masking, which we consider very significant and which has been written as a reply to Vicario; this paper is not among his most famous, perhaps due to the fact that it was published only as a "Report" (Kanizsa, 1982). A few words must be spent on two very important aspects of the last years of Kanizsa's activity. He was an extraordinary cultural patron for Italian psychology. He was virtually the life and soul of the glorious journal "Rivista di Psicologia" during the last ten years of its old series. When the journal was struck by crisis, following the same fate as the SIPS, the Italian Society of Scientific Psychology, in 1973 together with other younger scientists such as Minguzzi, Vicario, Umiltà, Legrenzi, Luccio and Palmonari, Kanizsa devoted himself to the "Italian Journal of Psychology", the first Italian publication (nowadays it sounds unbelievable) to demand the evaluation of a paper by two "referees" before publishing it. Those working for the GIP also formed a psy-

chology workshop that assisted the publisher "Il Mulino" in making publishing choices which were decisive for Italian psychology. Kanizsa was the spirit and undisputed leader of this group and that evening on March 13 he was traveling back to Trieste just from one of these meetings at the publishing house "Il Mulino".

However, Kanizsa had already had a key role in collaborating with other publishers up to the early 70s and he had promoted the translations of classics of psychology including Wertheimer, Duncker, Lewin, Metzger and Werner. His activity, however, was not limited to this. Kanizsa was also a wonderful inventor of scientific meetings. At the end of the 60s, with crisis affecting SIPS and the organization of scientific conferences of Italian psychologists, Kanizsa created the Trieste meetings on perception, by informally institutionalising (excuse the apparent contradiction) the meetings which had sporadically been held at the Trieste Department, for a number of years. These meetings were attended by Italian perceptologists, especially from Padua, Bologna and Trieste areas and usually centred around famous foreign scholars such as Wolfgang Metzger who, in his frequent trips to Italy, had rarely missed the opportunity of coming to Trieste. These informal meetings were fundamental in the development of Italian psychology. The conditions were such that no one had to talk about completed research, but only to tell colleagues informally about the research in progress so that the suggestions from others could actually be put into practice. The younger generation of psychologists no longer identified with the Gestalt tradition, nor with that of Gemelli nor with Behaviourism, which had never really caught on in Italy. The new word was Cognitive Psychology and Kanizsa, far from withdrawing into a Gestalt sectarianism, listened very attentively to these new theories and tried to create opportunities for the old guard and the new generation to meet. We should not fail to mention another extremely interesting side to Kanizsa's personality; the painter. He started painting by chance about forty years ago; tracing black dots on a white canvass, he would form shapes and structures by grouping, in deference to the figural laws: he did not set to work with a precise plan, but went along with the development suggested by the painting itself. Only recently, and in a limited number of paintings had he started to add (a little) colour. Though his painting started almost as a game, it received important recognitions, that Kanizsa was very proud of. He exhibited his canvasses also at the Venice "Biennale", the most important Italian international exhibition of modern art.

Death came upon Kanizsa while he was working intensely both as a scientist and as an artist; it came

upon him at the end of a peaceful day spent among his students, friends and colleagues. He will be deeply missed by all his friends. His untimely death will mean a great loss to the scientific community. He leaves us a huge legacy but also a feeling of deep regret for the unfinished research he was working on.

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