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Influences and Motivations in the Work of a Palestinian Artist/Inventor

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ABSTRACT

The author sketches his development as an artist and inventor, specifically related to his Palestinian background. Early work on Arabic type design, on an instrument for stereoscopic drawing and on an instrument to aid perspective drawing is discussed and technically summarized. The artist's watercolor paintings, which reflect his experiences of war, the loss of his homeland and life as an exile in Japan, are also discussed, as is his invention of a device to trace the position of the sun's shadow and various optical devices. Finally, the author documents the development of a new theory to explain the diffraction of waves and a proposed method to cancel this effect.

INTRODUCTION

I am a Palestinian Arab artist, inventor and physicist who was born. in Jerusalem in 1942, educated at a Quaker school at my hometown in Ramallah, and then studied physics and art at the American University of Beirut. A year spent at Saint Martin's School of Art in London (around 1963) and another at Pendle Hill School, a Quaker Center of Study and Contemplation near Philadelphia in the United States (1965), completed my formal education. Between 1966 and 1970 I worked with United Nations (U.N.) agencies concerned with Palestinian refugee education and information in Beirut, Lebanon, then moved to Japan, where I have lived and worked ever since, painting, inventing and doing research in optics.

Having lived in Palestine before its occupation by the Israelis in 1967, and then in Lebanon at a watershed period for the Palestine liberation struggle, I have been greatly influenced by the political events, social and religious values - even the geography of my homeland and the physiognomy and costumes of its people. In this paper, some of these and other influences will be sketched, describing their effects on my creative life. Of course, by its nature such an autobiographical analysis is bound to be subjective and possibly even biased but that is an unavoidable penalty of having to write about oneself.

CULTURAL AND POLITICAL SITUATION IN PALESTINE

The Palestine of the mid-1940s was relatively prosperous and peaceful, despite the tensions created by the war in Europe. The country had then been under British Mandate rule for a generation, and Zionist plans for taking over the predominantly Arab country were well under way, but open hostilities would not break out until 1947. Thus my earliest memories were of a peaceful home surrounded by orange groves in Jaffa, of solid stone houses and a venerable Arab heritage and language. My family, a middle-class family belonging to the Eastern Orthodox Christian church, lived at ease in the predominantly Moslem culture. I was given my Russian first name because of my maternal grandfather's work as an honorary consul, helping Orthodox Russian pilgrims visit the Holy Land.

When the 1948 war erupted, my family escaped to Lebanon. After a year, we returned to live in Ramallah, a summer resort north of Jerusalem. The contrast between the Old City of Jerusalem, with its medieval, theocentric way of life, and Ramallah, with its gentle rolling hills, grape orchards and wildflowers, amazed and delighted me, and I was nourished by both places.

In this setting there were four primary sources of my ideas: church life, where rites were piously repeated, sometimes without real understanding of their significance; the surrounding culture of Islam ever-present in the beautiful chants of the mu’azin calling for prayers without the aid of loudspeakers; Palestinian and Arab nationalism sparked by the shock of losing Palestine and absorbed by listening to the radio speeches of Nasser; and lastly a veneer of European 'modern' culture and values, adopted by the educated Arabs of the time. In a society where the names of Allah and the prophet Mohammed, and of Christ and the Virgin Mary were used in everyday speech on almost every occasion, these Western values were viewed with eagerness and caution at the same time. It was in part the science and technology of the West that allowed the occupation of Palestine; while the humiliated Arabs were eager to learn these arts, there was as yet no clear course of how to think or react. It was only after more bloody wars, particularly that of 1967, that Palestinians confronted the totality of' the disaster before them and the Palestine Liberation Organization (PLO) emerged as a response to this attempt at our annihilation as a people with a distinct identity, heritage and land.

These violent changes and challenges that my generation experienced had a profound influence on my world-view and intellectual development. On the one hand there was the indigenous Palestinian Arab culture, virtually unchanged over centuries and millennia, a world of flowing robes and gentle manners, elaborate religious processions and ancient inscriptions on walls, a truly Arab culture. On the other hand, suddenly all this was snatched away by an occupation supported by European and then American political needs and ideas, amid the economic and strategic realities of oil politics and the Cold War. The tension between the great respect I felt for my ancient culture and the need for swift adjustment to absorb the shock of new values and realities was reflected in my paintings

Fig. I . Arab Jerusalem, watercolor, gouache and gold foil on paper, 528 x 728 mm, 1982. The title refers to the city's Arabic name, Al-Quds (the Holy One), written to the left. The rock, with Jewish, Christian and Moslem symbols, shows the city's eternal religious heritage. More transient political events are indicated by the symbols of claimants, invaders and occupiers of Jerusalem throughout its history (Palestinian to the left; Israeli, Crusader, Roman, etc., to the right).

Many of them are influenced by the solidity of rocks (Fig.1) and stones, yet tempered by a knowledge that even rocks and stones are affected by the flow of light or water. It was a sensibility that combined immovable solidity and ethereal transparency, a love for the tangible and traditional combined with an irrepressible imagination and need for change. It was fertile ground for a would-be artist and inventor. The understanding and support of my parents largely offset society's indifference to the arts, which was a reaction to all the economic and political woes facing the society at that time. My older sister Tania became a talented soprano singer, presenting the works of classical Western and also modern Arab composers to local audiences. My younger sister Vera also became an artist, a successful potter and scholar specializing in Islamic art history.

A MODERN ARABIC TYPEFACE

One of my first projects was a study of Arabic typography. Although Arabic calligraphy is famed for its glorious perfection as an ancient art form, its transformation into printing type caused several technical and aesthetic problems, since type makers simply tried to imitate the calligraphic style without making the necessary adjustments. For example, dots, the carriers of important information in Arabic script, became almost invisible. Inspired by the writings of the English typographer Eric Gill, who advocated a simple, clean, sans-serif type design, and by firsthand studies at the British Museum of' an early Koran written in Kufic script, I designed and patented a general-purpose, simplified Arabic typeface that I named after Jerusalem, Al-Quds [1,2] , shown in Fig. 2. Although such 'modern' Arabic lettering without distracting ornamentation was popular for shop signs and product names, a suitable typeface for printing using simplifications of this sort (such as Al-Quds) had not been designed. Eventually, modern typefaces became popular for magazine headlines, but unfortunately Al-Quds is not yet available as an Arabic printing type.

(Note: As of 2014 AlQuds font is available and in use. See vladimirtamari.com/typography.html).

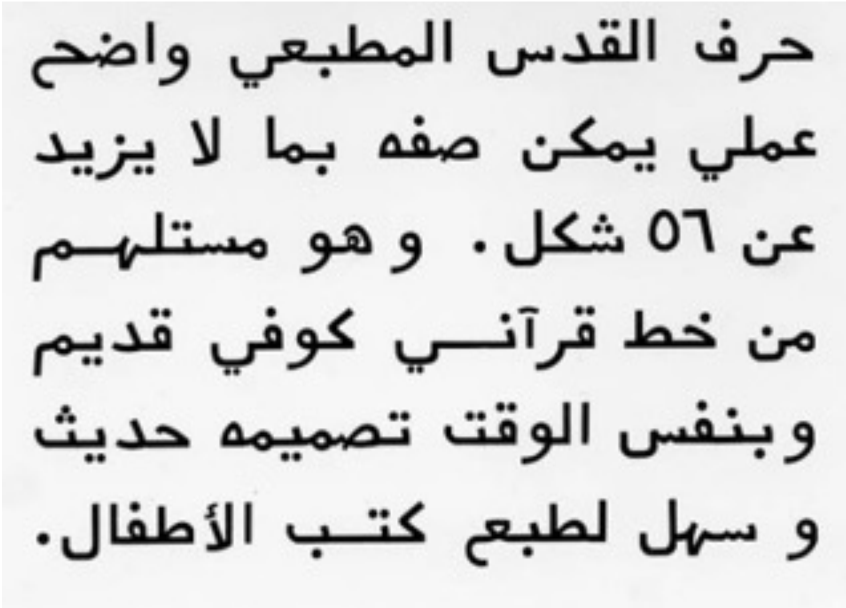

حرف القدس المطبعي واضح
عملي يمكن صفه بما لا يزيد
عن ٥٦ شكل. وهو مستلهـــم
من خط قرآنـــي كوفي قديم
وبنفس الوقت تصميمه حديث
و سهل لطبع كتـــب الأطفال.

Fig. 2. Sample of Al-Quds Arabic printing font (c. 1972). Only 56 characters are needed to set an Arabic text with this type-face.

THREE-DIMENSIONAL DRAWING

The clarity of light in Palestine - the ever-present sunshine and the unpolluted air -lends sharpness and solidity to the appearance of things there. Even at great distances, people and objects appear distinct and complete, undimmed by mists. The sense of distance and visual space is heightened under these conditions. Here was a reality that combined the perception of sculpted volume with the color and light of paintings - but there was no method of painting nor of sculpting that I could use to express this intense visual reality of space and color in three dimensions. A major theme in the study of art history is the concept of the point-of-view: the physical and psychological position of the artist when viewing the world [3]. The people of Palestine have no tradition of studio art, despite the rich visual vocabulary of Islamic architecture, Arabic calligraphy and decoration; yet we look at the world around us in a unique gaze: a peaceful yet intent look around, combining keen observation with a detached, even contemplative, study - the observer usually being very still, perhaps sipping coffee at a sidewalk cafe or stopping for a moment from the work at hand. Perhaps the long history of invasion that Palestine has witnessed, with the passing panoramas of foreign armies, caravans, pilgrims and tourists attracted to the Holy Land, has encouraged this look of anticipation combined with careful analysis. This stationary viewpoint and the need to express the richness of spatial solidity were combined in my next project, the invention of a three-dimensional drawing instrument (3DD) [4-10]. The 3DD (Fig. 3) enables the artist or designer to 'draw in space'.

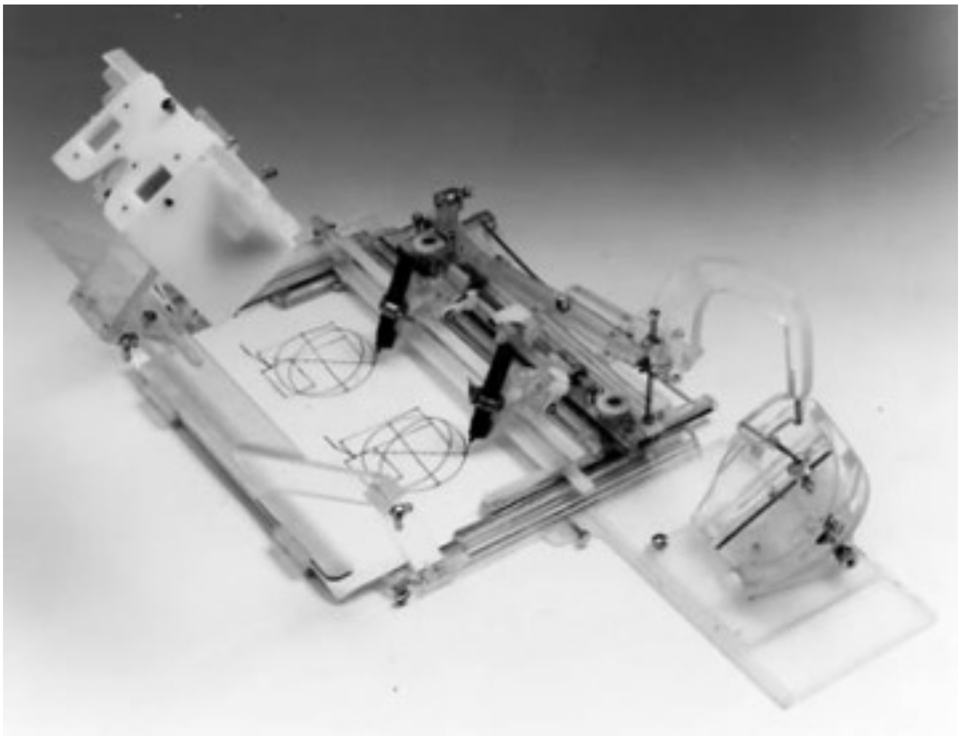


Fig. 3. Three-dimensional drawing instrument (3DD) built by the author (c.1982). A special attachment (shown at right of photograph) allows the drawing of spherical forms and axonometric projections. (See also the diagrams in Fig. 5.)

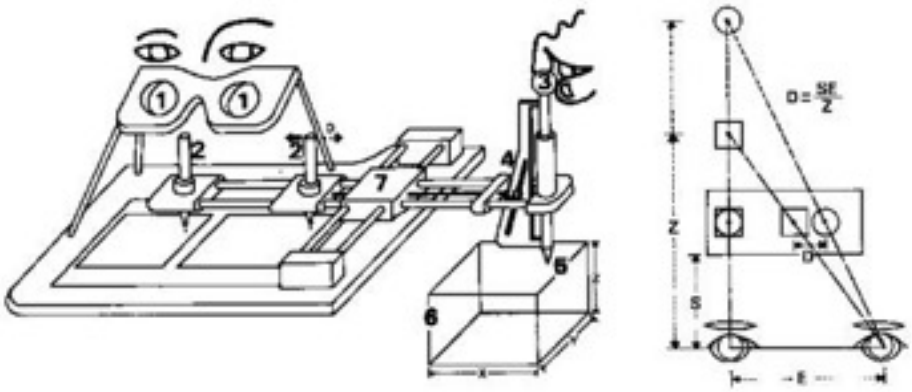


Fig. 4. The principle of the three-dimensional drawing instrument (3DD). When viewed through the lenses of a viewer, the combined picture appears solid, like a wire sculpture.

The instrument allows two stereoscopic views [11-13] to be drawn simultaneously by moving a handle in three dimensions. In order to see these drawings (see Figs 5a-c) in three dimensions, the left and right views must be visually fused, preferably by using a two-lens stereoscope. Without lenses, the three-dimensional effect can be obtained by looking at a pair of similar drawings and relaxing one's eyes until they see 'double' (i.e. four images appear) ; further relaxation will cause the two central images to fuse into a three-dimensional drawing.

Figure 4 illustrates the principle of the 3DD: (l)Lenses of the stereoscope. The right eye looks through the right lens and sees only the right pen and paper. Similarly, the left eye, looks through the left lens and only sees the left pen and paper. The brain fuses the left and right views, to create an image of one ‘space pen' and one 'space paper'. (2) The pens. In this design only the right pen makes the parallax shift (D) . (3) Drawing handle. When the handle is lifted up the vertical z-axis, the right pen moves slightly to the left. This makes the 'space pen' move nearer to the observer. lf the handle is moved horizontally in the x-y plane, the 'space pen' draws a flat diagram. A combination of x,y and z movements produces space lines. (4) Cam for converting movement along the z-axis into parallax shift (D) . (5) Tracing point for space drafting. lf a small object is placed within the 'drawing space', then the 3DD can trace the contour of the object in space. (6) 'Drawing space' or model space. Within this space all drawing operations take place, whether freehand or by contact tracing. Note, however, that, while the binocular visual space/image depicted in the three-dimensional drawings can extend as far as the horizon, the stars and beyond, the physical rectangular space in which the handle can move is very small. (7) Parallel mechanism for moving the instrument in the x-y plane. The first prototype of the 3DD was built in Arab Jerusalem in 1964, but it was lost when my home was hit by an Israeli rocket during the 1967 war. Subsequently I spent some 15 years building and perfecting models of the 3DD and making hundreds of three-dimensional drawings depicting scenes in Palestine and Japan

Fig. 5 Three-dimensional stereoscopic drawings made with the 3DD. All drawings measure 260x155mm. (a) Resurrection from Jerusalem, colored inks on board, 1978. (b) Jerusalem Way, ink on film with acrylic colors, 1982. (c) Cyclamens Grow Freely in the Palestinian Mountains. Pencil on paper, 1979.

Closely connected with this invention is that of the Perspector (Fig. 6) [14,15], an instrument I invented in 1984, which enables architects and designers to draw the perspectives of structures from a given point of view with accuracy and ease. No vanishing points or other graphic calculations are needed: the structure's ground plan, or top view, is traced on the horizontal board while the final drawing is automatically drawn on the vertical board. This is possible because the instrument is merely a three-dimensional model of the actual perspective situation.

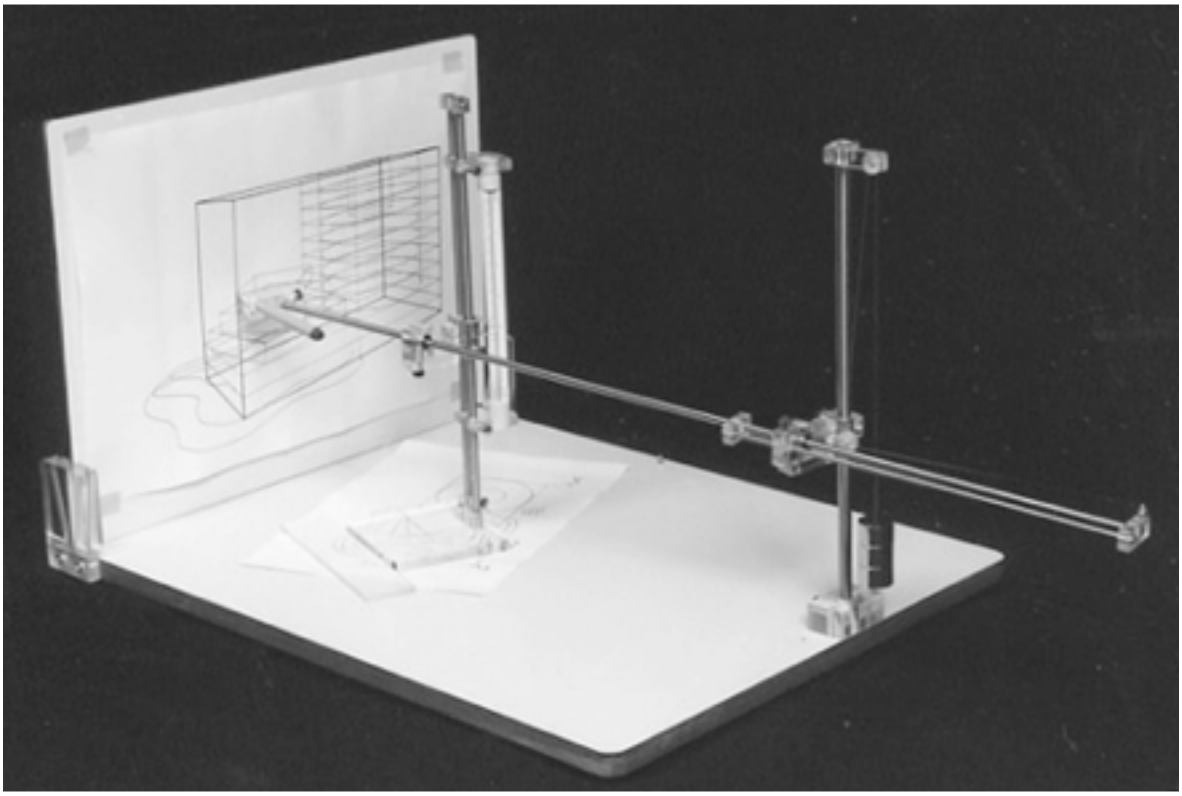
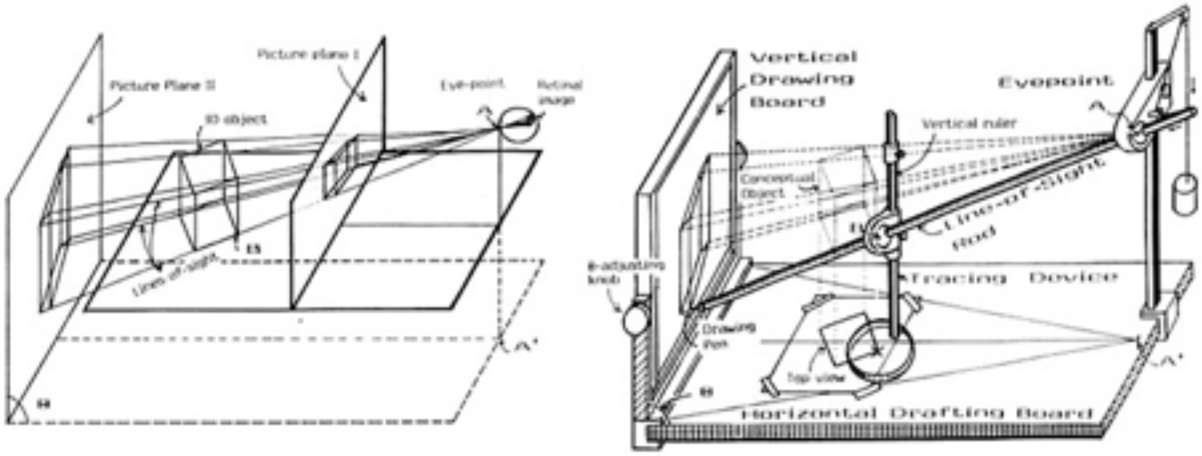


Fig 6. The Perspector, an instrument for automatically producing perspective drawings of structures with horizontal and vertical lines, circles, free curves, etc.



(a) *(b)*

Fig. 7(a,b) The principle of the Perspector. The fixed point of view (a) becomes literally a mechanical joint (A in b), while the line of sight (a) becomes a steel rod (b). Although the basic idea goes back to Dürer, the concept is here adapted to practical architectural needs.

This is illustrated in Fig. (7a), where the classic Picture Plane I intersects the lines of sight between the eyepoint and the three-dimensional object or model. In the Perspector, Picture Plane II intersects the lines beyond the model. Except for size, the projections on Planes I and II are identical. In the Perspector, the perspective situation (Fig. 7a) becomes a mechanical model (Fig. 7b) . (A) is the eyepoint and (B) the point where the line of sight meets a given point on the conceptual model (itself a vertical projection from the ground plan of the structure being drawn) . By setting the joint (B) at the correct scale elevation along a vertical rule and then tracing the top view, a pen on the tip of the line-of-sight rod automatically traces the perspective drawing onto the vertical board.

PALESTINIAN IMAGES

The 1967 Arab-Israeli war clearly marks the period of my exile from my homeland. The Palestinian paradise that evolved over thousands of years became lost to the harsh realities of military occupation. During my work with UNRWA (United Nations Relief and Works Agency for Palestinian Refugees) I helped film the exodus of thousands of refugees across the Jordan river. The vivid scenes l witnessed included a mother screaming at her daughter for losing a baby sibling in a vast refugee camp of tents built in a desert called Wadi Dlil (literally meaning 'Valley of the Lost'); a small farm devastated by napalm; the smiling face of an Israeli soldier holding a machine gun, answering my "salaam" with a "shalom", yet firmly stopping me from crossing the bridge that leads to Jerusalem, Ramallah and my family. Besides making vivid abstract paintings reflecting such times, I created what might be called 'revolutionary propaganda'. I worked with Mona Saudi on a book of drawings and interviews with Palestinian refugee children [16] , edited a documentary film about Jerusalem titled called Al-Quds [17], made political cartoons, and designed posters and symbol marks for the growing movement of Palestinians intent on liberating our homeland. Both as an artist and intellectual, I keenly felt my responsibility to 'tell the world' about what I saw happening in Palestine. Whether directly or indirectly, this need to insist on our identity (Golda Meir once said "there are no Palestinians") was a strong motivation for poets, writers and artists of my generation. It might be argued that this 'propaganda' aspect in some of my paintings (see Fig. l) is artistically unsuccessful, as compared to more sublimated landscapes such as the abstract paintings (Figs. 8a, b.). Nevertheless, the need to tell the truth as I saw it in a world where the word 'Palestinian' is synonymous with the word 'terrorist.' overcame any aesthetic considerations. Taken together, all these activities earned me 3 days and nights in an Israeli prison when I tried to visit my hometown in 1976 under a 'family re-union' plan, which amounted to a visa allowing me to visit my parents for 2 months, then more exile. Except for two brief visits to Jordan, I have lived continuously in Japan since 1970, where my Japanese wife Kyoko and I have raised two daughters, Mariam and Mona.

Fig. 8 Paintings by Vladimir Tamari (top) Mozart's Magic Flute Played in Ramallah Hills*, 568x721mm, gouache and golf foil on paper, 1986. (bottom)* Seventh Heaven *, watercolor and gold foil on paper, 553x744mm, 1990*

CHRISTIAN ROOTS AND THE JAPANESE EXPERIENCE

As a child I went regularly to church and was attracted by the piety of people around me, while at the same time I looked with silent amusement at some of their all-too-human expressions. Apart from a love and awe of Palestine's holy sites, I had little use for religion. It was the turmoil of the years in Beirut that for me paved the way for a religious experience complete with an intense peaceful vision of light and God's love. While this experience took mc deeper to my roots as a Palestinian Christian, it coincided with my move to Japan, a country that is physically and culturally remote from my Arab background. Together, these two experiences helped me view my homeland from a more detached and objective point of view, even while I carried its wounds as an individual. The cross became a central theme of my paintings, even of my pictorial compositions themselves. The move to Japan was not merely an escape to the mist-shrouded gardens of Kyoto, where I recovered some of the stillness of the 'Palestinian gaze' lost in the years of conflict, but it was also the fulfillment of an old attraction to a finely developed culture, epitomized by Hokusai's print "View Through The Waves off the Coast of Kanagawa" (c. 1831) and photographs of Ryoanji, the Kyoto stone garden, which fascinated me as an art student. Within Japan itself, these influences seemed at odds with a highly industrialized and Americanized culture, and I lived as an exile-within-exile, dreaming of Jerusalem while living in Tokyo, one of the world's largest cities [18] . Although I was welcomed by my Japanese family and friends, my activities as an inventor and artist were simply too individualistic to be understood by society at large, adding to my homesickness. The death of my friend Hani Jawhariyeh, a PLO cinematographer killed while filming a battle in the civil war in l-Lebanon, and the death of' my father only increased my feeling of isolation from my roots. After years of failing to convince Japanese companies to manufacture the 3DD, I needed to start a new project. I took to observing the stars and set myself the challenge of designing a completely new kind of telescope.

OPTICAL INVENTIONS AND STUDIES

As a young child, l was fascinated with the rays of sunlight entering the gloomy attic of m)' home through a cracked roof tile and watched with fascination the particles of dust dancing in the light. This interest in sunlight found its way into my paintings, which often featured a bright disc of color or bands of bright telescope beams. Later I invented the Skiometer (Fig. 9), an instrument for drawing the exact shadow of a given structure cast at a particular time of day and year, at a given latitude[19,20], to be used by architects concerned with building codes in Japan.

In this way, through studying the geometry of the sun's radiation, I became fascinated with the study of telescopes and optics. Starting in 1980, this rapidly became a whole course of self-study and experimentation in optics and optical instruments. Among my inventions of this period were a stereoscopic system for focusing cameras [21], autostereoscopic display systems (non-holographic, flat pictures that appear three-dimensional without the use of lenses or filters) , an analog-digital method to calibrate/process imaging systems in general [22] and all kinds of unworkable designs for large telescopes.

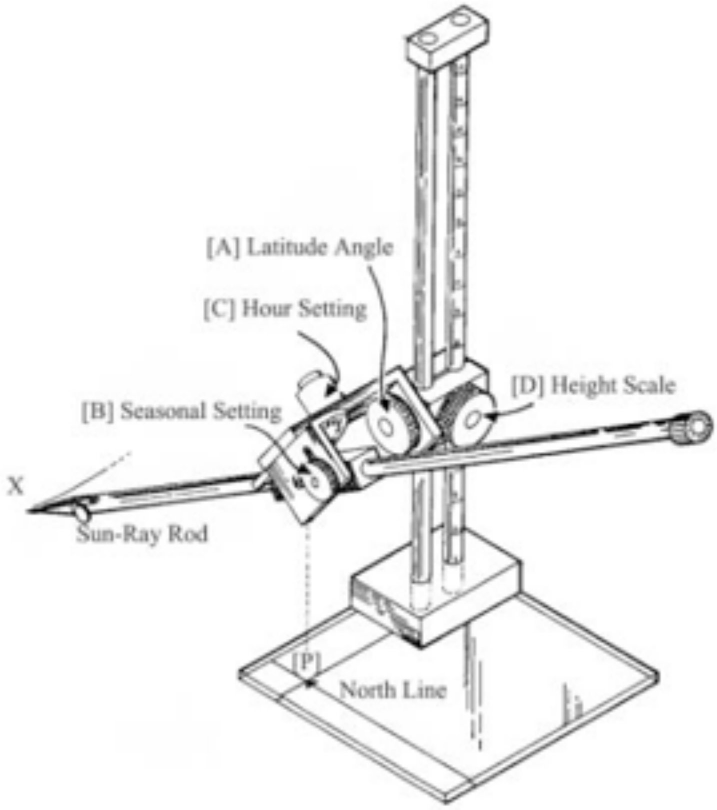


Fig. 9. The Skiometer, a device that helps draw the position of the sun's shadow cast by a new structure. The arrow (P) is oriented north on the structure's ground plan, and pointing at the vertical projection of some detail - such as the top corner of a wall - whose shadow is to be determined. Locks on the Skiometer are set for the detail's height (D) to scale, the building location's latitude angle (A), the hour of the day (C) and the time of year (B). The rod (representing the ray of the sun striking the structural detail) is allowed to slide until the pencil point (X) at the end of the rod reaches the ground plan and draws the correct shadow point.

The theft of 18 of my paintings in Washington, D.C. on the way to an exhibition, as well as the devastating Israeli invasion of Lebanon and the resulting massacre of Palestinians in 1982 [23], only increased my need for a retreat into the clean and pure world of optics and light. Palestinians everywhere feel hounded by a world that has little understanding or sympathy for our aspirations. Yet, against all odds we have resisted and clung to the dream of a just peace and a return to our homeland. We have to break through a solid wall placed in our path. Perhaps this desperate mood provided me with the impetus to try a different kind of breakthrough: to attempt solving an ‘impossible' problem in physics.

Diffraction is a natural effect in nature, best understood by the spreading of water ripples in a pond: straight ripples become bent when they encounter an obstacle such as a stone in their path. In telescopes, cameras, radar and many other imaging systems, diffraction limits the resolution or sharpness of the image from a given instrument, and causes the divergence of laser beams from their straight paths. *(Note: In 1983 I jotted down an idea for a method - different from the work discussed below - to bypass the diffraction limits in microscopes. Exactly the same concept won others the 2014 Nobel Prize in Chemistry - see vladimirtamari.com/superresolving-microscope.html)* It is beyond the scope of this article to go into complete technical details, except to say that in December of 1984 I had a crazy notion that it might be possible to prevent diffraction from occurring at all! This meant that a new type of wave form not found in nature would have to be invented. lf this idea were actually to work, it would solve not only the problem of improving telescope resolution, but also that of microwave parabola antennas; it would improve missile tracking and guidance, radio telescopes and scanning microscopes and would make laser beams truly straight. lf successful, it would be an important breakthrough in optics that would have many strategic, technical and scientific applications.

Working virtually alone, without easy access to references and journals, I could explore the most unusual ways to solve the problem. And it was here that I came to apply the Palestinian concept of basata. This word means ‘it is simple'. It is used in the sense of 'it's OK'. Is there a problem? Basita, it can be solved in this or that way. Palestinians hate complexity in anything. Our folk costumes are made of innumerable embroidered stitches, and yet the patterns and shapes appear quite simple from a distance. Social and moral values must be clear and well-defined. The country is always in a state of social or political flux, and to survive people must live simply and directly. There is even a Palestinian proverb that ridicules unnecessary complexity, likening it to a man who reaches with his right hand behind his head to hold his left ear and say ”this is my ear".

Mathematical models used so far to study diffraction employ a complex web of straight rays of radiation from the plane of a lens or antenna (Fig. 10a,b) .

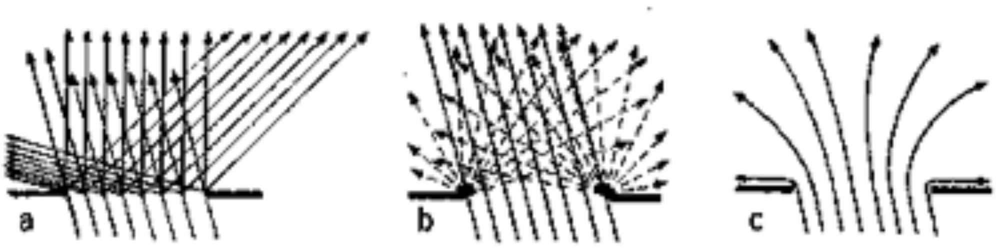


Fig.10. Mathematical models explaining optical diffraction effects. (a) According to the Fresnel-Huygens principle. (b) According to Young’s Edge Scattering. (c) According to Tamari’s Diffraction Theory. The arrows show the direction of propagation of light, while the dark lines show an opaque obstacle.

Given this complexity, it is no wonder that physicists despaired of ever canceling the effects of diffraction. With the innocence of an amateur, I needed to understand the phenomenon in a simple and direct way. If water flows around a rock, forming curved streamlines (smooth lines of flow) , why cannot the photons of light also curve gracefully around an obstacle such as the edge of' a lens? Basita, let it be as in Fig. 10(c). My Streamline Diffraction Theory [24,25] and my invention of a method to straighten out these curved paths by refocusing, canceling the diffraction effect, are still being studied and debated.

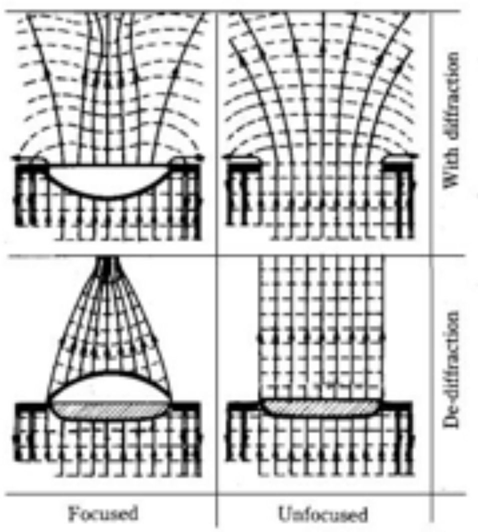
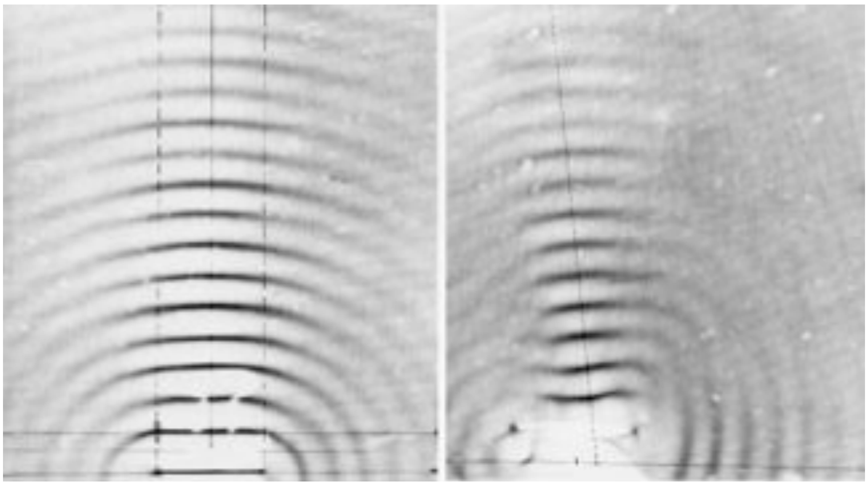


Fig. 11. Diagrams illustrating focused and unfocused, diffracted and de-diffracted waves.

The diagrams in Fig. 11 illustrate focused and unfocused, diffracted and de-diffracted waves. Whether a wave is focused or unfocused, the presence of diffraction causes the streamlines (arrows) to spread and dissipate the field's energy; this causes the wave-fronts (dashed lines) to bend and prevents a sharp focus, as can be seen in the upper two diagrams. This loss of focus and energy can be prevented: the edges of the emerging wavefront are made to experience a quarter-circular phase retardation function with a radius larger than a wavelength (for example, by the shaded lenses in the lower two diagrams) , providing just the necessary bias to prevent the stream-lines from bending. Experiments that I conducted at home using ripples in a simple tank of water seem to prove that de-diffraction is possible (Fig. 12).



(a) *(b)*

Fig12(a,b). Preliminary proof of the author's Streamline Diffraction Theory was provided by ripple tank experiments of unfocused water waves. (a) The typical elliptical wavefronts of a diffracted wave caused by a vibrating flat plate. (b) This spreading is prevented by de-diffraction as seen in the photograph at right. Here a plate with curved rims pointing up was used, concentrating the energy of the ripples. The ripples at the bottom right are spurious, caused by the back of the curved rim.

Perhaps the process is illustrated by our instinctive action when shouting to a distant listener. Our voice is weakened because diffraction causes the sound waves to spread after leaving the mouth. So we bend the waves near the mouth by cupping our hands around the emerging sound waves, and the de-diffracted waves proceed more or less in the forward direction. Awaiting more rigorous proof, I will just say "Allah A 'lam” meaning ‘God knows!’.

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9. I. Rock, Perception .New York: Scientific American Library, (1984) p. 60 contains a three-dimensional drawing by V. Tamari.

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11. The fascination of stereoscopic drawing and painting has challenged many artists, scientists and mathematicians since Wheatstone invented the stereoscope in 1838. See R. Ferragallo, "On Stereoscopic Painting", Leonardo 7, No. 2, 97-104 (1974) ; and H. Layer, "Exploring Stereo Images", Leonardo 4, No. 3, 233-238 (1971).

12. The scientist J.C.Maxwell made stereo drawings of field equations, and artists such as Marcel Duchamp and Salvador Dali have made stereoscopic images. Also see M. Gardner, "Illusions of the Third Dimension", Psychology Today (August 1983) pp.62-67.

13. While my work on the 3DD was done independently, there have been several other attempts to design three-dimensional drawing instruments, the most rigorous made by J.T. Rule (U.S. Patent No. 2,171,894). P. Stephen's three-dimensional 'etching tool'(US Patent No. 4,343,091) and the anaglyphic device described by R.L. Gregory which can sketch simple forms. See R.L. Gregory, "Drawing in Three-Dimensional Space", in The Intelligent Eye (New York: McGraw-Hill, 1970) pp. 124-169.

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23. During this period, my life and work was featured. in an N.H.K. Japanese national television program entitled "Palestine Through Pictures" aired 9 December 1982.

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25. V. Tamari, “The Cancellation of Diffraction In Wave Fields”, Optoelectronics- Devices and Technologies 2, No.1, pp. 59-82 June 1987.