Organic Functionalism: An Important Principle of the Visual Arts in Waldorf School Crafts and Architecture

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Waldorf education was intended not only to be an effective, holistic, child-centered approach to the education of children but also to be a force for larger cultural change. Do we who work in Waldorf schools ever think of ourselves as cultural revolutionaries? One of Rudolf Steiner's often-overlooked ideals for Waldorf education in this connection was the development of a certain harmony between the approach to teaching applied visual arts—handwork and crafts—and the approach by which the forms and spaces of the surrounding classrooms were designed and built. The same ideals were to guide both kinds of form-creating activity.

Steiner envisioned the development of a new cooperation between crafts/handwork, manual training, and artistic feeling.[1] His indications for the teaching of crafts in the Waldorf schools aimed to lay the foundation for this direction in the students' developing will and feeling, so that the combining of utility and beauty could gradually become a practical habit, both within school graduates and, through their influence, in society in general.[2] Following an identical principle of design, school architecture and crafts instruction would together serve a new vision of the spiritual renewal of the design elements in our everyday environment.

A few quotations from Rudolf Steiner will indicate how he felt this to be a compelling social need of modern times: "[D]o we not see how art has lost its connection with life? . . . We see how inartistic our everyday surroundings have become. Art has made an illusory progress. All the buildings around us with which we come in contact in our daily routine are as devoid of artistic beauty as possible. Practical life cannot be raised to artistic form because art has separated from life."[3] "All the atrocities which surround us in any city of Europe we may happen to be in, would vanish if only we would cultivate for a few generations the sense of beauty which lives unspoiled in every child."[4] "We need today to bring about the marriage between life and art which, however, can flourish only in the soil of a free life of spirit. . . . Imagine every schoolroom, not decorated in the way often thought artistic today, but shaped by an artist in such a way that each single form is in harmony with what his eye should fall upon when the child is learning his tables. Thoughts that are to be socially effective cannot work socially unless, while they are being formed, there flows into the soul as a side-stream of the spiritual life what comes from a really living environment. For this, however, art needs to take a quite different course during children's growing years from what is now accorded it."[5]

What are the principles of the approach Steiner wanted to inaugurate in the Waldorf schools? He

indicated the essential concept in a comment on handwork teaching: "The starting-point in handwork and the crafts should always be the purpose to be served by the object in question. This is what determines its color and form. . . . In every case we must take into account the purpose which the object has to fulfill in life—that is the meaning of handicrafts."[6] Likewise in architecture, Steiner indicated that the first step is to ask oneself "What happens?" i.e., what activities are to go on within a building?[7] Around these activities, these functions, the forms and spaces of the building should be designed. He used the analogies of the close-fitting relationship between a walnut kernel and its nutshell, as well as between a cake mold and a cake, to depict the kind of harmonious connection he intended between form and function (thinking of "function" in a broad, multi-dimensional way). The classrooms and school buildings were intended to support the educational functions and the processes of human development that take place within the school.

Form follows function. Style follows use. This is the fundamental concept. Its practice means that every work of design will have a functionally appropriate, individual form or structural gesture. This applies equally to large buildings and to the smaller, more intimate objects of our everyday life.

In the case of smaller, utilitarian objects, the individualized form-gesture should express the character of the object's invisible function or purpose, especially its relationship to its human user. Louise van Blommestein, the original crafts teacher at the Fortbildungsschule ("Continuation School") in Dornach, recalled Steiner emphasizing that in all the artistic objects created for daily life "it was the purposeful relationship to the human being, for whom they were being made, that was important, and this relationship was to be expressed in design and color."[8] A building or a wooden spoon was fully functional (or beautiful) only when all aspects of its effects on users were satisfied by the designed form. This was possible only when the form was developed "organically" from its internal function and intended user activity, "as if grown out of the object itself."[9] Ideally, the forms designed would not only fulfill but also visually declare their holistically conceived functions. This is an approach to design that I have called "organic functionalism."[10]

Such objects should also be designed so that they "fit" artistically into their intended surroundings. A dining room table should not appear the same as a library table. Looking at a tablecloth embroidered by a student, Steiner once indicated how specific a visual design could be: "This is a tablecloth for use on a round table in a reception room in which guests assemble to drink tea."[11]

Through efforts along these lines, the artistic element can arise directly from the everyday practical activities of life, from those activities that give the object or building itself its meaning. Art does not then remain isolated from ordinary life within museums and galleries but can flow out into daily experience. "Beauty must not remain captive in museums," announced Steiner. "Step by step we must work for its release."[12] He felt this desired social development, which Waldorf education was intended to serve, to be important for the very renewal of spiritual life within society:

> It is a matter of great and social significance to men, that everything by which they are immediately surrounded in life should take on an artistic form. Every spoon, every glass, should have a form well adapted to its use, instead of a form chosen at random to serve the purpose. One should see at a glance, from its form, what service a thing performs in life, and at the same time recognize its beauty. Then for the first time large numbers of people will feel spiritual life to be a vital necessity, when spiritual life and practical life are brought into direct connection with each other. . . . art, born of spiritual science, [will] attain to the power of giving direct form to every chair, every table, to every man-created object.[13]

What do these principles mean in actual practice? The following examples from the crafts curriculum, primarily from Steiner's own lectures on Waldorf education, will help make the approach of "organic functionalism" more concrete and understandable. After this, we will look briefly at school architecture.

Embroidery Design

Waldorf students usually learn to embroider in the fourth grade, sometimes starting as early as the third grade. In seventh grade they expand this foundation in connection with clothing and sometimes take up more advanced embroidery in the ninth grade. Steiner once remarked at a teacher's conference, "There are people who embroider a thing, but whose embroidery might equally well be on something else."[14] Organic functionalism demands that an embroidery design express the function of the object onto which it is embroidered and the relationship of that object to the human being.

If, for example, the object is an embroidered glove, then one should be able to see that this glove is for a human hand. The asymmetry of the hand—the thicker palm and back of the hand contrasting with the more slender fingers—as well as the structural character of the muscles and bones within the hand, can all be expressed, to an extent, in an embroidered pattern. Traditional crafts designs often have something of this character (**figure 1**). It is similar for the foot with the decoration of the slippers often made in sixth-grade handwork classes, where the "form and coloring must be especially strong and heavy round the heel, for this is where the weight of the body rests most strongly. . . .Toward the front the motifs should be lighter in color, as well as round the opening for the foot."[15] This reflects Steiner's principle that the inside of a useful object should be lighter than the outside.[16]

Another important principle in relation to the human user was expressed in a remark Steiner made about an ink-pen wiper, whose surface had been completely covered with embroidery by the student. Rather, he commented, it should have been designed to leave a space free for the thumb to take hold of it (as in **figure 2**). What a person does with his or her hands in using the object must enter into the embroidered design. It was a basic design principle that "an object should always be lightest in color where a human being has to hold it."[17] A similar idea applies to the design of an embroidered wallet or needlebook (**figure 3**).

These principles received an interesting elaboration with Steiner's comments on the task he set a ninth grade class to embroider a cushion or pillow. We quote here in full from a telling report by pioneer Waldorf crafts teacher Hedwig Hauck:

> This very question—how to embroider a cushion—had been discussed by Rudolf Steiner on various occasions. "For," he said, "it can happen when you lie on a modern cushion that you wake up and find the embroidered pattern imprinted on your cheek." In the Christmas lectures given to teachers in 1921 he made sketches on the blackboard and said: "It isn't possible to lay your head on this cushion (**figure 4**), because the thing in the middle will scratch you! It does not express the real function of a cushion at all. This is how it should be done (**figure 5**) . . . and now you can only lie with your face to the right. If it is to be done really artistically, the same design must be put facing left on the back of the cushion" (**figure 6**).
>
> All kinds of questions arose among the listeners as to how else a cushion could be artistically designed. It was thought, for example, that it would be fully in harmony with the function of the cushion if it were embroidered only along its four edges, for Rudolf Steiner had said in Dornach on another occasion that in the middle of the cushion is the human being—nothing is there—but around him are his dreams.
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> When he was shown a cushion embroidered in this way along its four edges (**figure 7**), he laid it flat on his open hand and tried, turning it in all four directions, to lay his head on it, until he gave up the attempt and said: "But how can I get into it? Here it is closed—there it is closed—it is closed on all sides. One cannot get in at all.'" Then he took a pencil, drew a sketch of a cushion (**figure 8**), and said: "It must be embroidered in such a way that one can see where the head and the neck should be. The design must open out towards the bottom so that the human body can get in, and in the middle at the top the design opens out again."[18]
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> After he had sketched the embroidery for the cushion he drew a number of short firm strokes along the bottom seam and said: "The lower edge must be strongly emphasized; it must be clearly defined. The side edges must be too, but less so as you approach the top. The lower edge must be

especially strong (there is no seam along the top). Then on the back of the pillow (**figure 9)** you can embroider something in all four corners, or you can embroider in the middle, to show that one cannot lie there"(**figure 10**).[19]

Cosies for tea or coffee pots, Steiner noted, should have a lot of reddish color in them to show that they are used to keep the beverage warm.[20] They should also be designed to show where the opening is located (i.e., below) as well as which end retains the heat (**figure 11**).[21] The same principle would be true in reverse for the workbags often sewn and embroidered in grades 3 or 4 (**figure 12**) as well as for handbags or shopping bags.[22]

Aside from being designed to fit into its future surroundings, a tablecloth should also be designed for a table with a certain number of legs (**figures 13 and 14**). Thus, one could see visually for just what kind of table and purpose a tablecloth was intended. An embroidery design for a dining room tablecloth or placemat ought to leave space for silverware and plates, which could be enclosed in a kind of frame whose design took into consideration the number of people at the table (**figure 15**).

Clothing

In the seventh grade, and usually for one or two years thereafter, Waldorf students learn to make items of clothing, first by hand sewing and then by machine sewing. Steiner encouraged teachers to try to overcome the dictates of current fashion and teach the children to design their own clothing in a freer, more artistic way that expresses a relationship to the specific personality of the wearer and to the part of the human body involved.

One of his favorite examples with regard to clothing design tries to make a clear, functional distinction between the embroidered design for the neckline at the top of a dress and one for the hem at the bottom:

> You see girls . . . sitting in a needlework class sewing some kind of pattern round the neck, round the waist-band, and round the hem of a dress, and one is dismayed to find that it is always the same pattern! And when you meet a young lady hooped around in this way, she looks as though she has been squeezed together by this pattern which is the same above and below. Head and feet have been completely ignored, while in fact the pattern ought to be metamorphosed in accordance with these (**figure 16**).[23]

In 1922 at Oxford he spoke as follows:

> The child must learn very early on that a band designed for the neck has a tendency to open downwards, it has a downward direction; that a girdle or waistband tends both upwards and downwards; and that the lower hem of a dress has an upward-striving tendency, and must have a kind of base below upon which it stands. It is a terrible thing if a child is taught merely to design a band artistically. The child should know how the band should look according to its position on the human being wearing it (**figure 17**).[24]

Furthermore, remarked Steiner, a garment should be lighter toward the top to show a relationship to air and light, and heavier (darker) toward the bottom to show a relationship to the ground (likewise for shoes, which are actually in contact with the ground). "Face and hands express the human spirit and radiate out, so to speak, so that near these, the colors should always be lighter."[25] In general, he added, it would be good to design a garment to be symmetrical to the central vertical line of the body's front.[26]

With regard to clothing accessories, gloves and shoes were already mentioned under "Embroidery Design." The design and trimming of a hat should likewise be in keeping with its function. Steiner suggested that the hat designer "should express the fact that the hat is placed from above downwards onto the head: it bears a similar relation to the head as the roof to a house."[27] A hat "should sit firmly on the head as though held by it, and, . . . if there is a brim, a gentle transition should be made from it to the part of the hat close to the head."[28] A brim must be bent downward in the back, but in front "you can bend the brim upwards, so that the face is free of covering. Then even the shape of the hat says that it is protecting the head, but allowing a free view into the world."[29]

Woodwork

Throughout the Waldorf woodwork curriculum, which begins in fifth or sixth grade and can continue through twelfth grade, a variety of utilitarian objects are made by the students. The fundamental functional principles of the design of these objects are established near the beginning with one of the first projects, the carving of a wooden spoon. There, it is important that the handle of the spoon is designed and carved in a somewhat asymmetrical, rounded form that fits comfortably into the shape, size, and grip of the human hand that will use it (**figures 18 and 19**). An impression of the hand's grasp might be made first in clay as a guide. The same principle can be seen in gradually more complex projects, such as a small serving bowl (**figures 20 and 21**); also note how the concentric pattern of tree rings is used to help shape the bowl area) and an unusual knife handle (**figure 22**), which fits with remarkable precision into the irregular hollow shape of an adult human hand. (This would more likely be a letter-opener project in a Waldorf school.)

A few other projects, mostly from later grades, illustrate the same ideal of fitting the object's design to the way it will be used by a human being. Carved candle holders include handles adapted to the grasp of the human hand (**figure 23**). A carved wooden box features a broad, overhanging lid with the underside of the lid grooved to fit a lifting finger (**figures 24 and 25**). Lids for such boxes can also be carved with suitable indentations for the thumb and fingers to lift (**figure 26**).

In their junior and senior years of high school, students may also begin to create items of furniture. A common first project is a three-legged stool with the seat slightly gouged out to fit the rear end of the body that will sit on it. The idea that a chair or other piece of furniture is beautiful only to the *eye* Steiner called "an absurd idea." Rather, he said, "We want to *feel* the chair, feel the beauty of the chair when we *sit* on it."[30] Artistic beauty must always arise in close connection to actual use.

Book Design

In the eleventh grade, Waldorf school students learn the art of bookbinding. Steiner placed a high value on learning this craft: "In bookbinding the children have to learn how to unite something spiritual with the physical."[31] Ideally, the students first study the content and structure of the book before beginning a book cover design. The design will then arise out of the ideas or story of the book combined with the essential nature of the book cover's function.

Steiner's numerous comments on the design of books can only be summarized here. A book cover (or folder) should express its purpose as a *cover* by being darker than its contents, the pages within. The design of the cover should also show clearly which is the top and bottom and which is the front and back. The supporting back should normally be darker and less articulated than the front. To prepare the reader, the ideal would be to represent the essential content of the book in the cover design. However, the design should be primarily located in the upper left-hand area of the book cover. The lower right-hand corner and edge can be left uncovered by design or text (or perhaps contain another design motif pushing in from outside the cover) in order to indicate where the hand grasps the cover to open it: "The place where we touch or take hold of an object should always be lighter than the rest of it. It will then be as though the human being were radiating light." One should be able to see from the design of the cover that it is meant to be opened (for an example, see **figure 27**). However, commented Steiner, today one seldom sees this; rather, books "usually bear some design which actually requires one to leave them shut, not to open them at all."[32]

In general, an upright oblong shape should be used for anything written or printed, while a horizontal oblong shape should be used for drawings and pictures (**figure 28**). A book (or perhaps each chapter) might also have an end-vignette on the last page to bring the content to a conclusion or to summarize visually its essential content or mood. Visually, every part of the book design must clearly belong to the whole.

Color in Interior Decoration

Steiner once observed that there are many small

household items that can be made by hand and then painted by the students (e.g., lamp shades), paying special attention to the functional role of color within the home environment. As Steiner observed on a number of occasions, the individual character of each color must be carefully adapted to its particular use:

> "If for instance you think of green," he said, "you can easily think of green card-tables. Because a game is a limited, pedantic activity, something very philistine, one can think of such an arrangement—a room with card-tables covered with green. What I mean is that it would be enough to make you run away if you were invited to play cards on a mauve table. On the other hand, a lilac-colored room or a room furnished throughout in mauve would lend itself very well, shall we say, to mystical conversation—in the best and in the worst sense. . . . Thus we note that by virtue of its own nature color has an inner character; whereas green allows itself to be defined, lilac, peach or flesh color tend to spread into vagueness."[33]

On another occasion he tried to reinforce the importance of a connection between the aesthetic impact of a color and its particular use:

> "I want to say this: if I should enter somebody's dining-room and find people eating there from plates which had a red glaze, it would give me the impression that these were people who wanted to enjoy their food like real gourmets. But if I saw them eating from blue plates then I would think they were not gourmets but just hungry people wanting to satisfy their appetite. Somebody else might have another impression, but that is not what matters. What matters is, that everything one meets in life seems to have an aesthetic effect on one. This forms itself into a sort of faint imagination or vision. . . . Even if it is not generally true that a party of people eating from plates which are colored red must necessarily be a crowd of gourmets, from an aesthetic point of view it still holds true. In the same way one could say that if somebody receives me in a red room and stands there in front of me without saying a word, being a really dull sort of person, I feel like saying: 'He really lies by receiving me in this red room, because it makes me expect somebody there who has a lot to say to me and doesn't let me talk all the time.' It makes him look as if he were deceiving me—his way of living seems a lie to me."[34]

The particular qualities of each color should also be used in designing wall painting or wall decoration within the school. Again, the colors must be related to functions—either the function of architectural details (such as a warming or intensification of wall color toward the entrance to a classroom or beginning of a stairway) or to support the educational functions taking place within the classrooms. Steiner provided a number of recommendations for the specific colors of each classroom, changing through the years as the children mature. This idea leads us to consider architecture once again.

School Architecture

Rudolf Steiner—who himself designed seventeen buildings and gave more than seventy lectures on architecture—often spoke about the powerful effects exerted upon us by the buildings in which we live, work, study, learn, and shop. He maintained that the best architectural and utilitarian design does not arise only from considerations of structural and physical functions, but rather should be "living forms" that also speak to the emotional, psychological, mental, moral, and spiritual natures of human users. Architectural forms and spaces should arise organically from such "inner functions" as well as from outer functions. To authentically relate to and nourish these inner dimensions of human experience, argued Steiner, a building should present "an environment that will express the human being's inner being in forms."[35] Sculptural forms with dynamism and organic movement speak better to the human psyche than do the static or geometrical forms of most previous architecture and design. Hard, psychologically opaque, or merely intellectually conceived forms can stir semiconscious feelings of alienation in their users; they are not experienced as physically or psychologically "user-friendly."

What might these ideas mean in practice when applied to the design of a Waldorf school building? First of all, it is important that the artistically based

instruction of the teacher is supported by classroom spaces that are also artistically modeled (and for which a standard rectangular room is generally the least suitable). A more organic architecture offers greater support to the organically related, mobile, and flexible thought-processes that Waldorf teachers hope to develop in their students. But, most essentially, the application of these ideas would involve progressive changes in the floor plans, ceiling designs, and overall shapes of classrooms as students advance through the grades and through different developmental phases (see **figures 29, 30, and 31** for examples of such plans).

The progression of rooms begins with the simply whole, unitary, roundish spaces of the kindergarten and preschool, reflecting and welcoming the children's experience of the world during those years. Not only the entire room, but the windows, doors, ceiling, and furnishings can have a rounded or curved form (**figure 32**).

That which is softer, more rounded, and more unified in the preschool and early elementary years will gradually become firmer, more articulated, and more angular as students advance through their schooling. Appropriate classroom murals, wall pictures, and colors should also change through the grades, as described by Steiner.[36] For example, the walls of the first-grade classroom would be painted in warmer, reddish colors and feature images from fairy tales. By contrast, the walls of the sixth-grade room would be painted in cooler, bluish colors and feature images of the individual human being, especially a human being in nature ("a man standing in a landscape in sunshine or rain; or a small lake with a man rowing on it," suggested Steiner). Being surrounded during each school day by pedagogically appropriate wall paintings can exert a powerful counter-force to the less helpful influence of the television, film, and advertising images that flood the experience of most students today.[37] In a similar way all of the visible elements of a building's design —lighting, doorways, corridors, stairwells, materials, arrangement of spaces, and so on—can be shaped out of an awareness of their role within the educational functions of the structure.

But what about the form of a school building as a whole? Although I could profitably discuss examples of Steiner's own buildings to make clear what his design principles might mean in architectural practice,[38] the Rudolf Steiner School in Ittigen, Switzerland, provides an excellent example of how a whole building can manifest these design principles. Located just outside Bern, this school building was completed in 1977 and was the design product of architects Arthur Bieri and Gerhard Egger working closely with Eckhart Dönges, a sculpture and eurythmy teacher at the school. The three-level building is carefully related to its surrounding environment—on the one hand, to the alpine mountain vistas on all sides (**figure 33**) and, on the other, to a traditional broad-roofed Swiss farmhouse that stands nearby on the same property **(figures 34 and 35**). The school building is threefold in overall conception, with a center section flanked by two long wings. This configuration expresses the essential function of the building: a nurturing, motherly gesture of protection as the two "arms" of the school building embrace the broad plaza in front of the school where children (and parents) often gather. This same gesture is repeated in a sculptural motif over the central doorway (**figure 36**) as well as in the framing for the auditorium stage and the railing for the rear balcony, where orchestra or choir are frequently positioned during school assemblies and performances (**figures 37 and 38**).

Unlike many featureless, rectangular modern buildings, the Rudolf Steiner School clearly announces its main entrance in bold, projecting forms and clearly identifies its front and back sides (see **figures 36 and 39**). The rounded contours and fluidly modeled stairs of this entrance invite the visitor to move easily upward and into the school. Even the door handles support the welcoming expression (**figure 40**). Spaces for the hand to fit comfortably inside are carved out of each wooden door, and the right-hand indentation is cut and articulated somewhat more sharply than the left-hand one. This is an expression of the fact that most people are right-handed and, thus, more awake on their right side. The handles on the inside of the door are shaped like large, simple buttons, making it visually obvious that one pushes them to open the door, even as the forms on the outside express that they must be grasped and pulled. The organic visual design directly tells the user the function of the door with

no need for "push" or "pull" signs.

In the entrance lobby tall, muscular columns clearly and reassuringly support the somewhat low, "child-scale" ceiling. They also provide an architectural image of the kind of "wakeful uprightness" that we hope students will adopt as they make the transition from outdoors to their classrooms (**figure 41**). On the stairways dynamically interpenetrating forms encourage the students to keep moving up or down the stairs (**figure 42**). The doorways to each classroom feature organically-designed frames whose flared bases express their solid foundations. The angularly curved tops reflect the natural human experience of a curved sphere above—whether we think of this as our own head or the sky (**figure 43**). Both the shape of the doorway and the type of wood used change as students progress through the classrooms of different grades, moving from rounded to more angular and wakeful forms.[39]

The classrooms are arranged within the building in accordance with an awareness of the qualities of different spatial directions. Rooms for the more earth-related lessons (such as the sciences, gardening, physical education, woodwork, and metalwork) are located on the ground floor. Classrooms for grades one through twelve are located on the main (second) floor, moving from east to west. The spaces for more aesthetic or refined subjects, such as music, eurythmy, painting, and sculpture, are located on the upper floor. To give but one example of an individual classroom, one of the two eurythmy rooms shows how it echoes the graceful, rhythmic movements of that art while the element of uprightness is reinforced by sculptural pilasters along the side walls **(figure 44**). The room uses radiant heating provided by a network of water pipes beneath the flooring. This system provides an even, cozy heat, particularly for the feet of the moving eurythmists. The Ittigen building demonstrates how architecture can make an important and positive contribution to the process of education.

Conclusion

The examples discussed above should make clear the essential design principle that Steiner intended to be used equally within the Waldorf crafts curriculum and in the school building's architecture: Every form is sensitively adapted to the nature of the human beings who use them. But this "organic functional" aspect of Steiner's artistic hopes for Waldorf education has been much neglected in North America. For example, in the recently published book *Will-Developed Intelligence: Handwork and Practical Arts in the Waldorf School,* although many benefits of Waldorf crafts instruction are discussed, there is hardly a mention of this design approach, which for Steiner was to be one of the chief guiding principles of education in the crafts.[40]

This principle was to be a means for "ennobling" children's feelings for color, form, and line already during the elementary school years so that they could bring an unspoiled sense of practical beauty with them into their life activities and thereby gradually transform the design of our surroundings to something more enlivening and harmonious.[41] At the same time the progressing crafts curriculum could help to gently lead children into a more pragmatic, "down-to-earth" relationship to their still new earthly home, as noted by Michael Martin: "The child is borne into life on the stream of beauty; it is the guarantee against succumbing to the 'merely useful' on earth. But the human being must enter the other stream, coming from the earth itself, must connect with the necessities and demands of life."[42]

In the end, design measures such as these—whether introduced at the "micro" level of crafts instruction or at the "macro" level of school architecture—not only hold the promise of best supporting the developmentally-based educational tasks of the Waldorf school but also of helping to bring an artistic element into the design of our larger everyday surroundings and buildings, a design element that will gradually make them worthy of the human being as a being of soul and spirit as well as body.

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7. Quoted in Rex Raab, "Rudolf Steiner as Architect," *Architectural Association Quarterly,* 12 (1980): 54.

8. Louise van Blommestein, "Rudolf Steiner in Action: Indications for Design in Handwork—Part I," *Steiner Education* 31, 1 (January 1997): 33. Her recollections of indications from Steiner for crafts teaching and design are an invaluable record and a helpful complement to Hauck's book. The second part of her essay is found in *Steiner Education* 33, 2 (July 1999): 21-25, 28.

9. van Blommestein, "Rudolf Steiner in Action—Part 1," p. 33.

10. For a more detailed exposition of this theme in relationship to architecture, see my articles "Form Follows Function: The Hidden Relationship between Architecture and Nature," *Towards* 3, 2 (Winter 1989): 10-20; later rewritten as "The Form-Function Relationship in Architecture and Nature: Organic and Mechanistic Functionalism," Penn Valley, California: Center for Architectural & Design Research, 2000; and "Rudolf Steiner's First Goetheanum as an Illustration of Organic Functionalism," *Journal of the Society of Architectural Historians* 51, 2 (June 1992): 182-204; also reprinted as a booklet by Center for Architectural & Design Research, Penn Valley, California.

11. Hauck, *Handwork,* p. 29.

12. Steiner, *Lectures to Teachers,* p. 79.

13. Steiner, *The Social Future,* p. 94.

14. Rudolf Steiner, Teacher's Conference, November 16, 1922, quoted in Hauck, *Handwork,* p. 67.

15. van Blommestein, "Rudolf Steiner in Action—Part 2," p. 25; also see Hauck, *Handwork,* p. 25.

16. van Blommestein, "Rudolf Steiner in Action—Part 1," p. 33.

17. Ibid.

18. van Blommestein relates this as follows: "There must be a space at the top for the spirit to flow in and a space at the bottom so that the head can get into this colorful world of dreams." "Rudolf Steiner in Action—Part 2," p. 21.

19. Hauck, *Handwork,* p. 30 (different figure numbering is substituted). We are fortunate to have her more detailed account of the Christmastime 1921 lecture on "Aesthetic Education" that was reported much more briefly in summary by Albert Steffen and published in Steiner, *Lectures to Teachers,* pp. 77-82.

20. Hauck, *Handwork,* p. 42; see also van Blommestein, "Rudolf Steiner in Action—Part 2," pp. 22, 24.

21. Hauck, *Handwork,* pp. 20-21.

22. For more details on these items, see van Blommestein, "Rudolf Steiner in Action—Part 1," p. 35.

23. Quoted in Hauck, *Handwork,* p. 36; for an alternate translation, see Steiner, *Lectures to Teachers*, p. 79.

24. Quoted in Hauck, *Handwork,* p. 36; for an alternate translation, see Rudolf Steiner, *The Spiritual Ground of Education* (London: Anthroposophical Publishing Company, 1947; reprinted 1989 by Garber Communications [Spiritual Science Library], Blauvelt, New York), p. 103.

25. van Blommestein, "Rudolf Steiner in Action—Part 2," p. 24.

26. Hauck, *Handwork,* p. 37.

27. Ibid.

28. Ibid.

29. van Blommestein, "Rudolf Steiner in Action—Part 2," p. 28.

30. Hauck, *Handwork,* p. 67 (Teachers' Conference, June 17, 1921; see also Rudolf Steiner, *Practical Advice*

to Teachers, trans. Johanna Collis (London: Rudolf Steiner Press, 1976), p. 45.

31. Hauck, *Handwork,* p. 69.

32. Both quotations from Hauck's notes of the 1921 "Aesthetic Education" lecture, *Handwork,* p. 34 (see note 19 above).

33. Hauck, *Handwork,* p. 42; for an alternate translation, see Rudolf Steiner, *Colour,* trans. John Salter and Pauline Wehrle (London: Rudolf Steiner Press, 1992), pp. 32-33.

34. Hauck, *Handwork,* pp. 41-42 (from lecture of February 17, 1918).

35. Rudolf Steiner, *Ways to a New Style in Architecture* (London: Anthroposophical Publishing Company; New York: Anthroposophic Press, 1927), p. 11; also published in Christian Thal-Jantzen, ed., *Architecture as a Synthesis of the Arts,* trans. Johanna Collins et al. (London: Rudolf Steiner Press, 1999), p. 72.

36. Steiner's recommendations are repeated in Hauck, *Handwork,* pp. 74-78; can also be found in Part XI of E. A. Karl Stockmeyer, *Rudolf Steiner's Curriculum for Waldorf Schools,* trans. R. Everett-Zade (Forest Row, England: Steiner Schools Fellowship, various editions).

37. For more on murals, see Rex Raab, "Isn't It Time to Move Forward?" *Steiner Education* 31, 1 (January 1997): 5-7.

38. For more information in English on Steiner's architecture, see Hagen Biesantz, et al., *The Goetheanum: Rudolf Steiner's Architectural Impulse,* trans. Jean Schmid (London: Rudolf Steiner Press, 1979); Rex Raab, Arne Klingborg, and Äke Fant, *Eloquent Concrete* (London: Rudolf Steiner Press, 1979); Wolfgang Pehnt, *Rudolf Steiner: Goetheanum, Dornach* (Berlin: Ernst and Sohn, 1991); Kenneth Bayes, *Living Architecture* (Hudson, N.Y.: Anthroposophic Press and Floris Books, 1994); Rudolf Steiner, *Architecture: An Introductory Reader,* ed. Andrew Beard (London: Rudolf Steiner Press, 2004); David Adams, "The Goetheanum as White Magic, or Why Is Anthroposophical Architecture So Important," *Journal for Anthroposophy* No. 64 (Spring 1997): 13-46; see also the references in notes 10 and 35.

39. Elm is used for grades 1-4, oak for grades 5-8, and ash for grades 9-12.

40. David Mitchell and Patricia Livingston, *Will-Developed Intelligence* (Fair Oaks, CA: AWSNA, 1999). Another recently published compendium on crafts teaching, the long overdue translation of Michael Martin's *Educating through Arts and Crafts* (Forest Row: Steiner Schools Fellowship, 1999) is slightly better in this respect; see pp. 28, 60-61, and 70-71.

41. Steiner, *Lectures to Teachers,* p. 80.

42. Martin, *Educating through Arts and Crafts,* p. 70.

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