

ZONING FOR AMENITIES

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I

Bulk zoning is an awkwardly built haycock of factual material badly entangled around the firm legal doctrine of the police power and its conjoined rule of reasonableness.¹ One who would build better must first do a lot of unsnarling.

The regulation of "size, shape and placement of buildings on the land"² is a considerable area of bulk zoning. To say that this presently defines "bulk zoning" is unfortunately accurate. The misfortune is that the term covers a variety of things all related to zoning, but few have much to do with bulk as that word is commonly used and probably so understood. The bulk usage might be defended on Humpty Dumpty's theory that it means what the user chooses it to mean, "neither more nor less," but like Alice all non-users are then needlessly put upon to do a lot of unlearning. Measured by Webster's standard,³ bulk zoning is a meaner description of the object to be described than is the label "liquid" on a box containing fifths of scotch, jugs of water, and carboys of acid. Each tag is more a secret than a specification.

The term completely fails to suggest the accepted purposes of such zoning regulations—control over population density, daylight, air, and open space—nor does it hint at the kinds of techniques applied in pursuance of the goals. The other great area of zoning law has a caption which evokes considerably more immediate understanding, at least among lawyers: use zoning.

The semantic flaying is meant to stress the need for novel thinking about an important area now so misleadingly named and inadequately charted as a whole that

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¹ The doctrine and the rule are stated succinctly in the landmark zoning case of *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365, 395 (1926). Before a zoning ordinance will be declared in derogation of U. S. CONST. AMEND. XIV, §1, its provisions must be ". . . clearly arbitrary and unreasonable, having no substantial relation to the public health, safety, morals or general welfare." For a thorough catalogue of authorities upholding the constitutionality of zoning as a proper exercise of the police power see 8 EUGENE MCQUILLIN, *THE LAW OF MUNICIPAL CORPORATIONS* 18-19 n.30 (1950).

² Comment, 60 *YALE L. J.* 506, 507 (1951). This is an excellent modern study of the problem. Among its many valuable contributions is a fine array of citations to local zoning ordinances containing many of the regulations used in the field. The quotation is in no sense meant as the object of any subsequent criticism any more than is the Comment from which it comes. It is inserted merely as a responsible point of departure beyond which I am trying to develop one of several themes for all of which I am solely accountable.

³ These meanings are the least remote from the subject:

"bulk, *n.* . . . 1. A heap; . . . 3. Magnitude or volume; spatial dimension; esp. considerable volume; great extent; imposing dimension . . . ; 4. A mass or aggregate, esp. one of large size; . . . 6. The main mass or body; the largest or major portion. . . ." WEBSTER'S NEW INTERNATIONAL DICTIONARY 352 (2d ed. unabridged, 1950).

one may not know where he is even when he reaches its interior. This carping preface also assumes a great truth in George Orwell's thesis that imprecise language and imprecise thinking nourish each other and poison the rest of us.⁴

The term bulk zoning is unclear and should be abandoned. If a more instructive denotation exists it should be used; if necessary a synthetic term could be formulated to identify that now anonymous portion of zoning law marked off by *zoning regulations of height, shape, and placement of buildings on the land which are applied to control population density, open space, and access to daylight and air.*

But the snarl will not disappear with a renaming. The material itself causes most of the difficulty, the rest being the result of too much classification and too little imagination.

Although it is relatively easy (and certainly necessary) to verbalize the ends of these zoning controls and the particular techniques employed to gain them, in practice ends and means are largely overlapping and sometimes identical. Everything seems to be happening at once. It is. Understanding is also impeded because such yields as result from the applied techniques are more often than not by-products. Frequently one has the feeling a refinery visitor might have as he expectantly watches an apparatus for gasoline and, unless he knows where and when to look, sees only kerosene and tar oozing out.

A simple experimental model renders this graphic.

On a sunny day set up a large tray in which a few cubes of different sizes are clustered tightly. The object of the experiment is so to arrange the cubes that each receives the maximum possible daylight. The control of daylight accessibility is, of course, one of the subjects of the larger inquiry. It is apparent that the daylight any given cube receives is a function of its relationship to the other cubes in the tray. Proximity and the bulk and sun orientation of each cube are the important factors in the relationship. The smallest or shortest cube at the cluster's center will likely receive daylight only on its top. To bathe the sides as well as the top of this cube we must move those pressing in on it sufficiently to expose its sides. This will create open space around it and will also give its sides access to air flowing across the model. Daylight has now reached the smallest cube, but the placement of the cubes in the tray, the flow of air among them, and the space around them have all been altered in the process.

Assuming we have made only these simple moves, when we say that we have created or controlled accessibility to daylight have we said everything? Clearly not, because more than this happened in the tray. Perhaps it is better said that access to light has been controlled along with air accessibility and open space around the cubes. In this primer example we observe three things happening at once. Because the point of the demonstration was daylight accessibility, open space and air accessibility appeared as side effects or by-products, but if we had sought open space around

⁴ GEORGE ORWELL, *POLITICS AND THE ENGLISH LANGUAGE, A COLLECTION OF ESSAYS* 162, 163 (1954).

the little cube, the by-products would have been otherwise: increased daylight and air accessibility.

The model has to be changed a bit before it begins to buzz like reality. Instead of a few cubes in a large tray, assume many oddly shaped forms clustered in a small tray, and assume further that they represent buildings occupied by people. If we start again toward the simple goal of daylight accessibility, we can make only a limited number of moves outward toward the edges of the small tray. Once this is done, the irregular forms must be so permuted that the result is as much daylight on as many of them as possible. Note how the by-products of the experiment have multiplied. Spatial relationships have altered. There has been a rearrangement of forms. Air accessibility has probably been affected. Since these objects are imaginary occupied buildings, there may also be effects on population density because building shape may be a determinant of occupancy numbers. Finally, the visual aspect of the model has probably altered a good deal more than it did in the first example. It ends up looking very different than it did at the beginning of the experiment.⁴²

If instead of seeking maximum daylight on all the objects we had tried to put as much open space as possible around them, consider how the by-products would have been changed.

On balance, then, at least three kinds of distinct yet related techniques are interplaying: controls over open space, population density, and accessibility to daylight and air. The objects of these controls are the stuff of the now nameless definition. Because of their linkages and because they function together if they function at all, it therefore seems best that they be thought of comparably. The clinching justification for dealing broadly is not yet apparent: not only do the large objectives hang together, but frequently the mechanisms by which they are sought are literally identical.

Before the details close in, the admirer of intellectual wholeness may ponder whether so closely a related set of objectives might not be reached through one detailed instrument of control. Experience, if not the experiments, quite clearly suggests that an all-purpose technique is out of the question. When it is unconsciously attempted, it does nothing well and most things poorly. In such problems there are a host of variables and although a single formulation may be possible (given the standards), it would be an administrative nightmare. In an age of punchcards and electric computers this conclusion, of course, is something less than firm. Pending automatization, the pattern will be that of few objectives and many techniques.

The nap has worn off the word ideals, but there is still much use in the concept. In truth, ideals should be the beginning and the end of urban zoning and planning yet they are starving for want of serious concern. Two questions abide here, one a

⁴² It is possible that the concept of such a model will to a small but intriguing degree be reproduced in the real world. Grand Junction, Colorado, is to have a six story building which will rest on a giant pivot or turntable with clockwork in its base. This mechanism will turn the building as the sun crosses the sky, orienting its two sides of translucent brick to the winter sun and turning them away from the summer sun. N.Y. Times, Dec. 6, 1954, p. 24, col. 4.

kind of utopian query, the other scientific. Each ultimately ramifies into zoning objectives.

What kinds of cities do we want? The question, rarely answered,⁵ rarely asked, haunts the inner life of the American urban planning movement and is a persuasive although infrequently advanced explanation of why this growing body of thought burns most of its energy trying to arrest and destroy urban decay rather than in creating a richly livable, fully desired urban setting. Both tasks are commendable. Both are necessary for genuine city growth, but they are as distinct as the absence of disease and a state of well-being.

Although far from won, the fight against urban decay is something most recognize and support even if there is much contention about tactics. That fight is sufficiently institutionalized to have its own battle cries such as slum and blight. Its vision of victory, which any reasonable man can grasp, is the slumless city. But beyond that few seem to go or care. Yet there lie the answers, if there are any, to the question of what kind of city and city life would offer the physical and spiritual resources necessary to build values which now sound like quaint phrases: pride and love of city from which so much of true citizenship flows.

The great impact of these zoning controls is visual. For better or worse they sculpt the face of the city with the architectural design limitations they impose on building shapes and sizes. They also govern to a sizable extent the amenities of daylight, air, and privacy, and assert limits on the distribution of urban population. These, of course, are important determinants of a city's character. Consequently, if widespread and continuous thought were applied to the long-run utopian query, it is very probable that the formulation of such zoning controls would be a much more purposeful task than it has been until now.

The second large problem is scientific. What are those standards, principally medical, which should govern accessibility to daylight and air, open space, and density levels? Although there has been relatively little canvassing of the question, the material that does exist⁶ is extremely useful and suggests more about the profile of a physically healthy city than we presently know about the profile of a beloved city.

It is too much ever to expect watertight standards here. The problem is laced with such real but vague psychological elements as the states of mind formed by variations in daylight and urban crowding. Yet other facts are quite finite: the relationship between disease and lack of daylight, impact of population density on sewerage facilities, the amount and quality of open space necessary for adequate juvenile recreation—to mention but a few. In any event, the courts' search for

⁵ Lewis Mumford is one of the rare probers. Over the years he has enriched both the questions and answers with unique scholarship and imagination. See, for instance, *THE CULTURE OF CITIES* (1938), and *CITY DEVELOPMENT: STUDIES IN DISINTEGRATION AND RENEWAL* (1945). See also, Riesman, *Some Observations on Community Plans and Utopia*, 57 *YALE L. J.* 173 (1947), and the interlocking PERCIVAL AND PAUL GOODMAN, *COMMUNITAS: MEANS OF LIVELIHOOD AND WAYS OF LIFE* (1947).

⁶ Notably, *AMERICAN PUBLIC HEALTH ASS'N, PLANNING THE NEIGHBORHOOD* (1948).

reasonable relationships between zoning controls and the classic elements of the police power makes no impossible demands for meticulously precise standards.

In this setting the controls operate toward formulated goals, the courts do their testing, and the city evolves.

II

THE CONTROL OF POPULATION DENSITY

It has been held that a municipality's power to regulate density rests on a grant of such power from the state legislature.⁷ Three distinct approaches have been used in exercising that power.⁸ Because any reasonable density control has to be something less blunt than a turnstile technique, each is to some extent indirect. This is not necessarily a weakening feature, but if the indirection becomes excessive the tools grow so cumbersome and crude that they cannot do what is expected of them.

Density controls have been imposed on (1) the shape of buildings, (2) numbers of people rather directly, and (3) building volume or the ratio between building floor area and the underlying lot.

Each exerts important effects on the level of urban density and reveals much about the intensity of urban congestion. They are of great significance in molding the design of buildings and consequently have had much to do with the visual aspect of the city. Some of the techniques impose unnecessarily severe burdens upon experimental design in architecture. Of this, little has been written by men in the field, although the existing literature⁹ does point up great gaps between traditional density controls and recent technological developments in building.

Limits on building height, the so-called set-back, and provisions for yards and courts are the methods traditionally used to order building shapes. The control of structural shape, of course, is intended to place limits on density.

Courts have widely upheld reasonable regulations over the height of buildings as a valid exercise of the police power.¹⁰ Although such measures were used early in this century,¹¹ they were first welded into the machinery of zoning in the pioneer 1916

⁷ *Barker v. Switzer*, 209 App. Div. 151, 205 N.Y. Supp. 108 (2d Dep't 1924) (the invalidated control limited number of families per acre).

⁸ For descriptions of methods of calculating population trends and density standards, see Nash, *Techniques for Calculating Demographic Changes and Density Standards*, in AMERICAN SOCIETY OF PLANNING OFFICIALS, *PLANNING—1950* 68 (1950); HARRISON, BALLARD AND ALLEN, *PLAN FOR THE REZONING OF NEW YORK CITY—FRAMEWORK FOR REZONING: POPULATION-TECHNICAL REPORT NO. 1 TO CITY PLANNING COMMISSION* (1949).

⁹ Agle, *A New Kind of Zoning*, *Architectural Forum*, July, 1951, p. 176, is a valuable example.

¹⁰ See, for instance, *Welch v. Swasey*, 193 Mass. 364, 79 N.E. 745 (1907), *aff'd*, 214 U.S. 91 (1909) (pre-zoning case validating act of Massachusetts legislature establishing two types of height districts in Boston); *Brougher v. Board of Public Works of San Francisco*, 205 Cal. 426, 271 Pac. 487 (1928), 107 Cal. App. 15, 290 Pac. 140 (1930) (building height regulation); *Brown v. Board of Appeals of City of Springfield*, 327 Ill. 644, 159 N.E. 225 (1927) (zoning ordinance); *Wulfsohn v. Burden*, 241 N.Y. 288, 150 N.E. 120 (1925) (zoning ordinance). CHARLES A. RATHKOPF, *THE LAW OF ZONING AND PLANNING* 455-456 (2d ed. 1949) and its SUPPLEMENT AND DIGEST 208 (1951) cite a number of other authorities.

¹¹ For example, *Welch v. Swasey*, 193 Mass. 364, 79 N.E. 745 (1907), *aff'd*, 214 U.S. 91 (1909).

New York Zoning Resolution. The initial motivation for the restrictions was primarily the daylighting of buildings rather than density control. This was particularly true for residential areas where aggravated congestion had not reached the proportions it had in commercial areas.¹² Their original justification has shifted, and they remain to operate in many cases as the sole limits on density.

Height controls are variously expressed from a simple footage statement of maximum height to ratios between street width and building height or variants thereof. The most interesting in terms of its architectural effects on the profile of the downtown metropolis is the set-back, a derivative height control which in effect terraces the upper façades of taller buildings. A regulation might, for instance, prescribe a set-back of three feet for every building story above twenty.

The stepped effect has been tartly dubbed the ziggurat after a form of Babylonian temple tower. Admirers of the clean-slab school of contemporary office design (*e.g.*, such buildings as the U.N. Secretariat) are offended by the pyramidal results imposed by the regulation. There are also those who find the ziggurat distasteful while harboring no special love for the unbroken façade.¹³

Save for one pregnant possibility,¹⁴ the era of immense eruption seems over, at least in Manhattan. There, although tall buildings are still being erected, they are overshadowed by such colossi of the 1930's as the Empire State Building (102 stories,

¹² See N.Y. COMMISSION ON BUILDING DISTRICTS AND RESTRICTIONS, FINAL REPORT c. II (1916).

¹³ See Mumford, *The Sky Line*, *The New Yorker*, Oct. 23, 1954, pp. 132, 134, 135. Mr. Mumford suggests that the ziggurat, although moderately successful as an insurer of light and air, actually enabled a vast increase in population density. Densities have markedly increased, but the set-back is not inherently to blame. It is rather a question of what if any density levels were assumed when that technique, among others, was applied. In reality, the limits on New York City's population are controlled by a set of regulations whose "envelope" if filled would have a resident population of about seventy million and a working population of around three hundred million. HARRISON, BALLARD AND ALLEN, PLAN FOR THE REZONING OF NEW YORK CITY, *op. cit. supra* note 8, at 4.

Mr. Mumford, out of sympathy with the ziggurat, feels little affection for the slab form as a modern theme which, he states, is fashionable today although first conceived in Burnham & Root's Monadnock Building in Chicago (1889). He says the form is ideal for the provision of light and air "but it is as outmoded as a Roman colonnade in a day when air-conditioning and effective artificial indoor lighting are commonplaces" (at 135). He does, however, commend the form for its release of architectural and investor imagination from the ziggurat "and the earlier, pseudo-cathedral tower of the Woolworth Building period" (at 136).

This article also restates a proposition which Mr. Mumford has been urging for some time: although tall buildings may return handsome profits for the builder, they may prove uneconomical for the investor.

¹⁴ Recently there have been persistent reports that the new management of the New York Central Railroad may erect a vast skyscraper where the Grand Central Terminal Concourse now stands. At an October 21, 1954 meeting of the New York Society of Security Analysts, Robert R. Young, Central's chairman, stated: "The air rights above Grand Central turned out to be much more valuable than the high value I had placed on them." It was reported Mr. Young was advised that a skyscraper development of those rights "may possibly double the value of our six hotels and vastly enhance all the other Park Avenue property . . . so we are certainly going to mark time on selling them." *N. Y. Times*, Oct. 22, 1954, p. 37, col. 6. There are growing pleas that the Concourse be spared this fate. *N. Y. Times*, Nov. 18, 1954, p. 32, col. 3.

At this writing, there is an alternative plan under which the Concourse will be preserved. Two earlier plans would do away with it. In each of the plans, however, a vast office building is contemplated in the development of the area. The most striking of these plans envisages an 80 story office building with an observation tower higher than the Empire State Building. *N.Y. Times*, Feb. 8, 1955, p. 20, col. 3.

1472 feet, 1931); the Chrysler Building (77 stories, 1,046 feet, 1930) and Sixty Wall Tower (66 stories, 950 feet, 1932). If shrinking height portends future downtown building practice, it could mean the eventual disappearance of the set-back, for in the last analysis it was great height which inspired it.

The set-back is sometimes coupled with provisions for building tower regulations. These allow greater heights than permitted by set-back controls if the tower occupies no more than a stated portion of the building lot and stands back a certain number of feet from all lot lines.¹⁵ It was under such provisions that many giant office buildings were erected. The combination of ziggurat topped with a tower squeezed thin by coverage restrictions has sometimes led to curious results in less than block-sized developments.¹⁶

Yard and court requirements are the other density techniques used to mold building shapes. They typically limit minimum sizes of courts,¹⁷ front,¹⁸ side,¹⁹ and rear yards.²⁰ All of these measures limit building coverage of the lot and, in conjunction with height limitations, their effect is to prescribe allowable building shapes. Like height regulations, yard and court requirements were initially directed toward light and air problems, but in the development of American zoning they have also come to be used as density restrictions.

These common measures for controlling building shapes and ultimately density suffer from too much indirection and consequently have failed to get any real grip on the problem. That they were initially fashioned for other ends partially explains their inadequacy. They are one set of answers to a somewhat different set of questions. Yard requirements in low density areas are the notable example. They are sparingly used there to secure daylight and open space minima with the result that

¹⁵ See, for example, ZONING RESOLUTION OF THE CITY OF NEW YORK §9(d) (unlimited tower height if building area above given level is less than 25 per cent of lot area and tower is at least 75 feet from the centers of all streets on which it faces); PHILADELPHIA ZONING ORDINANCE §20(c) (unlimited tower height provided tower occupies less than 25 per cent of lot area and is not within 25 feet of lot lines, and tower width is less than half the width of lot line toward which it faces).

¹⁶ "Typical of scores of resulting bad buildings is the venture now under construction alongside Rockefeller Center, with a tower so small that it is nearly half filled with utilities and shafts, but with lower floors so big that some desks will be 80 ft. from the nearest window!" *New York Rethinks Its City Plan*, Architectural Forum, Sept. 1950, pp. 122, 124, col. 1.

¹⁷ *Bebb v. Jordan*, 111 Wash. 73, 189 Pac. 553 (1920) (building regulation—light and air function).

¹⁸ For example, *Gorib v. Fox*, 274 U.S. 603 (1927); *Hayes v. Hoffman*, 192 Wis. 63, 211 N.W. 271 (1926); *Pritz v. Messer*, 112 Ohio St. 628, 149 N.E. 30 (1925). Compare *White's Appeal*, 287 Pa. 259, 134 Atl. 409 (1926). 1 E. C. YORLEY, *ZONING LAW AND PRACTICE* 407 n.6 (2d ed. 1953) cites a number of other authorities.

Front yard regulations are sometimes incorrectly called set-back lines. The improper usage traces back to a pre-zoning era in which some states enabled municipalities, under eminent domain, to establish set-back or building lines to delineate future street widenings. The misapplication of the term to front yard regulations can lead to the contention that the front yard requirement does not truly relate to the police power. EDWARD M. BASSETT, *ZONING* 61-62 (1940), citing *Bouchard v. Zetley*, 196 Wis. 635, 220 N.W. 209 (1928).

¹⁹ For example, *Ujka v. Sturdevant*, 65 N.W.2d 292 (N.D. 1954); *L. & M. Inv. Co. v. Cutler*, 125 Ohio St. 12, 180 N.E. 379 (1932); *City of West Helena v. Bockman*, 221 Ark. 677, 256 S.W.2d 40 (1953).

²⁰ *Wulfsohn v. Burden*, 241 N.Y. 288, 150 N.E. 120 (1925); *Honigfeld v. Byrnes*, 14 N.J. 600, 103 A.2d 598 (1954).

building size incurs no effective regulation. Furthermore, they are cumbersome to apply, particularly when allowable density levels have to be altered with any frequency. As elsewhere noted,²¹ the city planner could calculate maximum building sizes for building lots in high density areas, then render those into cubic or square footage which in turn would yield an estimate of allowable population. But any change in a given density level would require a series of reverse calculations before new density controls could be formulated.

Since mass domestic and commercial decentralization is now well under way,²² urban density patterns are in a new state of ferment. Changing concepts of healthy density standards can be expected as our knowledge advances. It is, therefore, likely that permissible density levels will begin to change rather often. This will throw an onerous administrative burden on those who must work with these controls.

More recent density regulations have come fairly close to direct head-counting. The usual methods turn on relationships between lot area and some other unit such as a dwelling, family, living room or bedroom.²³ In single family districts such regulations, of course, are pointless since only single family residences are permitted there. But until the minimum lot area per family is fixed density remains unchecked. Control in those situations is therefore handled directly by specifying lot minima.

The controls give the planner a virtually immediate and quite accurate idea of allowable density levels. All that he must know is readily available: lot area sizes and family sizes or average number of persons per room in question. Note, however, that the techniques are applied to residential areas and not to commercial districts.

These methods of density regulation have been criticized for the economic inequities they encourage by putting a premium on homes principally for the large or affluent family, thus allowing a zoning ordinance to exercise less than direct influence over building development.²⁴ At bottom is the vexed question of "snob zoning"²⁵ and the earlier inquiry as to what it is our communities desire as a physical

²¹ Comment, 60 *YALE L. J.* 506, 515 (1951).

²² For an enlightening study of the extent and social ramifications of this exodus, see Allen, *The Big Change in Suburbia*, Part I, Harper's Magazine, June, 1954, p. 21; *Crisis in the Suburbs: The Big Change in Suburbia*, Part II, Harper's Magazine, July, 1954, p. 47.

²³ See, for example, *Carey v. Cassidy*, 103 A.2d 793 (R.I. 1954) (Newport, Rhode Island ordinance prohibiting buildings accommodating more than two families for each 20,000 square feet of lot area barred conversion of barn into four-apartment house).

²⁴ Comment, 60 *YALE L. J.* 506, 516-517 (1951).

²⁵ A charged term for applying zoning regulations to create or perpetuate residential district exclusiveness. The cases harmonize in seeking to test for reasonableness of the restrictions, but more light is needed on the essential motivations behind such restrictions. See, *Simon v. Town of Needham*, 311 Mass. 560, 42 N.E.2d 516 (1942) (minimum one acre house lot in town near Boston sustained as not clearly unreasonable); *Dilliard v. Village of North Hills*, 276 App. Div. 969, 94 N.Y.S.2d 715 (2d Dep't 1950), reversing 195 Misc. 875, 91 N.Y.S.2d 542 (Sup. Ct. 1949) (ordinance requiring two-acre lot minimum in Long Island suburb upheld); *Franmor Realty Corporation v. Village of Old Westbury*, 280 App. Div. 945, 116 N.Y.S.2d 68 (2d Dep't 1952) (ordinance setting a two acre minimum upheld on authority of *Dilliard* case); *Weissmantel v. Village of Sands Point*, 129 N.Y.S.2d 640 (Sup. Ct. 1954) (invalidated amended zoning ordinance which, by adding exclusions in acreage computation, would have prohibited residence which fulfilled previous ordinance's one acre requirement; amendment

setting. Probably the most readily identified and intelligible answer today comes from the wealthier dormitory suburbs whose residents quite clearly and understandably prefer economic class homogeneity with its attendant symbols. The ample house on a spacious lot is such a mark. The proof of reasonableness sought by the courts here is a test of fact. Beyond this are challenging problems in social philosophy which cut across class lines and through many other areas of zoning controls.

The most promising density controls are designed to regulate the cubic content of a building²⁶ or the ratio between its floor area and lot area.²⁷

Cubage techniques are formulated from one of several possible relationships, such as lot area times some number or street width multiple. Limits are stated in terms of cubic footage or cubic yardage. Floor-area ratio is expressed as a multiple by which building floor area may exceed building lot area. Thus a ratio of 10-1 would permit a building floor area ten times the area of the building lot. Limits therefore are ultimately in terms of square feet. In the absence of any other controls, a floor-area ratio of 10-1 would permit a ten story building covering its entire lot, a twenty story building covering half its lot, and so forth.

Although not so direct as those discussed earlier, these techniques may produce a degree of control roughly equivalent to even the most direct measures but without some of their disadvantages.

Each method rests on calculating the number of people using a specified amount of building volume or floor area.²⁸ A statement of either cubage or floor area ratio

adopted subsequent to building application); *Fischer v. Bedminster Township*, 11 N.J. 194, 93 A.2d 378 (1952) (five acre minimum in strictly rural area not unreasonable per se); *Flora Realty and Investment Co. v. City of Ladue*, 362 Mo. 1025, 246 S.W.2d 771 (1952), *appeal dismissed for want of substantial federal question*, 344 U.S. 802 (1952) (three acre minimum in St. Louis area upheld).

Another technique which has generated conflict in this respect is the minimum size housing requirement. See, *Lionshead Lake v. Township of Wayne*, 10 N.J. 165, 89 A.2d 693 (1953), *appeal dismissed for want of substantial federal question*, 344 U.S. 919 (1953); *Williams, Minimum Building Size*, *American City*, Oct. 1951, p. 130; *Smith, More on Wayne Township and Minimum-Size Zoning*, *American City*, Nov. 1951, p. 133; *Williams, Economic Segregation Through Minimum-Size Housing*, *American City*, Dec. 1952, pp. 126-127; *Boldt, Pennsylvania Court Rules on Snob Zoning*, *American City*, April, 1950, p. 129; PLANNING ADVISORY SERVICE, AMERICAN SOCIETY OF PLANNING OFFICIALS, MINIMUM REQUIREMENTS FOR LOT AND BUILDING SIZE, INFORMATION REPORT No. 37 (April, 1952); REGIONAL PLAN ASSOCIATION, ZONING BULLETIN, ZONING FOR MINIMUM HOUSE SIZE (Nov. 1952). A useful summary of pertinent authorities appears in CHARLES A. RATHKOPF, *THE LAW OF ZONING AND PLANNING* 456-464 (2d ed. 1949). Mr. Rathkopf acknowledges this material to be essentially the work of Ralph W. Crolley, Esq.

²⁶ Reasonableness, of course, must be demonstrable when formulating such a control. *Frischkorn Construction Co. v. Lambert*, 315 Mich. 556, 24 N.W.2d 209 (1946) does not vitiate this technique although it did strike down one of its specific applications (14,000 cubic feet minimum unreasonable in context of particular neighborhood).

²⁷ This "floor area ratio" regulation has thus far appeared in but one case in which there was dictum approval. *Pritz v. Messer*, 112 Ohio St. 628, 635, 644, 149 N.E. 30, 32, 35 (1925). The date of the case indicates the long dormancy of the technique which in 1948 was referred to as "a comparatively recent concept." AMERICAN PUBLIC HEALTH ASSOCIATION, *PLANNING THE NEIGHBORHOOD* 40 (1948).

²⁸ Note ". . . that floor area ratios do not reflect population densities, because floor area per person varies (usually increasing as income increases). In order to measure population loads, an additional index of floor area per person should be used. This makes it possible to relate density in terms of floor area ratios to population density." AMERICAN PUBLIC HEALTH ASSOCIATION, *PLANNING THE NEIGHBORHOOD* 41 (1948).

can, after careful figuring, give the planner a rather accurate idea of the population density allowable in the area in question. Both methods can be applied to commercial and residential districts. Unlike other density controls, each is a direct building restriction which leaves the architect unhobbled by any one external form such as the ziggurat.

The floor area ratio technique is the better of the two. Square footage is a more workable architectural concept than cubage.²⁹ It is also supplanting cubage in cost estimating.³⁰ Although neither control is total, floor area ratio requires the fewest number of additional regulations in low density areas. It can be applied to all roofed areas such as breezeways, carports, porches, and tool sheds without special additional provisions.

The final advantage is that, unlike cubage, floor area ratio avoids placing a premium on the intense development of vertical space. Cubage control is really a control of the building shell. Once that maximum is set, the developer has a strong inducement to exploit available space by lowering ceilings in the building. This may have undesirable architectural results.³¹

If many smaller apartments return more to the developer than fewer larger ones,³² then both cubage and floor area ratio techniques encourage small apartment development. This could be counterbalanced by tying either control to a density regulation based on lot area per family or per dwelling.

III

THE PROTECTION OF LIGHT, AIR, AND PRIVACY

The forces leading to the 1916 passage of the landmark New York Zoning Resolution were manifold. Among these was a strong conviction on the part of the draftsmen and other informed citizens that adequate daylight and fresh air are vital to a decent urban life.³³ In retrospect this may appear an obvious fact. At the time, however, the community was probably not so aware of the axiom as we may like to think we are.

Intense congestion in New York had arisen from high population densities and was working against a good measure of privacy in the lives of great numbers of people. In addition to the unhealthy physical features, the pressures of large numbers of people living in too close contact with each other were causing adverse psychological effects upon family life.

²⁹ ". . . nobody figures cubage the same twice." Agle, *A New Kind of Zoning*, Architectural Forum, July, 1951, p. 176, at 236, col. 3.

³⁰ *Id.* at 238.

³¹ Low ceilings may give law offices that modish, mid-century look so typical of the latest in advertising agency design, but they also generate serious law library problems. Books, instead of slowly going ceilingward as they accumulate, arrive there much sooner than they would have in fusty, high-ceilinged days. The result is horizontal library expansion and premature space problems. The profession is well counseled here in one great motto of twentieth century architecture: form follows function.

³² Comment, 60 *YALE L. J.* 506, 519 (1951) suggests they usually do when the builder has a limited amount of floor area or volume available.

³³ N.Y. COMMISSION ON BUILDING DISTRICTS AND RESTRICTIONS, FINAL REPORT 9, 10, 27, 28, 45, 96, 105, 107, 108, 142, 152, 176-182, 199 (1916).

The need for fresh air, daylight, and privacy is no less important to urban life today than it was in 1916. These are constants, but urban growth and decay are not. Change also occurs in knowledge of standards applicable to the needs.³⁴ Zoning is one important potential for putting that information to work in urban development. It is not easy to generalize about what has happened to such necessities of life in our cities these last thirty or forty years, but undoubtedly where they have been guarded by zoning regulations protection has too often been mixed up with some other zoning controls, notably set-back and height limitations in high-density areas. Each is an example of one regulation for two tasks, and each mirrors the difficulties raised when one control is expected to do too much. In low density areas yard requirements have been the principal insurance, but they have worked inadequately because of negligible side yard limitations.

Pertinent authority is most scarce although what there is clearly supports the protection of these goals. Light, air, and privacy are valid aspects of the police power.³⁵

So far as light and air are concerned, the courts' conception of the police power would appear to be sufficiently broad to cover new techniques which should give more effective protection than hitherto possible. The regulations would operate in a technological setting somewhat different from the earlier days of zoning. Industrial architecture is noticeably shifting away from the dreary multi-story, mill-town forms toward low-slung slabs often set on large plots which afford parking space for workers. The structures frequently receive the amenities of light and air through the fluorescent tube and the air-conditioner. The amenities in modern office buildings often get the same processing. The development of plate glass manufacturing techniques has gone hand in hand with the displacement of brick and stone as the skin on such buildings. In domestic architecture the low cost of ventilating fans, increased louver usage, clerestory windows, skylights, and glass block³⁶ have made residential design a much more flexible task than it was some years ago.

Two suggested possibilities of control are the "angle of light"³⁷ and the "daylight factor."³⁸ The angle of light assures limitations on the vertical angle within which buildings may obstruct light and would likely result in more sunlight at ground levels, better air circulation, improved light on the sides of buildings, and an improved outlook. The angle is drawn from a point, say at street center, toward the restricted structures which may not rise higher than the line of the angle. To avoid

³⁴See AMERICAN PUBLIC HEALTH ASSOCIATION, *PLANNING THE NEIGHBORHOOD* 29-34 (1948).

³⁵*Gorieb v. Fox*, 274 U.S. 603 (1927); *Thille v. Board of Public Works of City of Los Angeles*, 82 Cal. App. 187, 255 Pac. 294 (1927); *Wulfsohn v. Burden*, 241 N.Y. 288, 150 N.E. 120 (1925); *State ex rel. Morris v. East Cleveland*, 22 OHIO N.P. (N.S.) 549, 31 Ohio Dec. 197 (1920); *Pritz v. Messer*, 112 Ohio St. 628, 149 N.E. 30 (1925); *Junge's Appeal* (No. 2), 89 Pa. Super. 548 (1927).

³⁶Agle, *A New Kind of Zoning*, *Architectural Forum*, July, 1951, p. 176, col. 3.

³⁷See HARRISON, BALLARD AND ALLEN, *PLAN FOR REZONING THE CITY OF NEW YORK* 45-48 (1950); *New York Rethinks Its City Plan*, *Architectural Forum*, Sept. 1950, p. 122; Comment, 60 *YALE L.J.* 506, 520 (1951).

³⁸See MINISTRY OF TOWN AND COUNTRY PLANNING, *REDEVELOPMENT OF CENTRAL AREAS* 43, 95 (1947); Comment, 60 *YALE L.J.* 506, 520-521 (1951).

possible ziggurat-like effects, the angle may be averaged over a given width of the lot parallel to the street. In addition, the angle would vary from district to district. By allowing an average angle, the architect is free to manipulate the "shoulders" of the building as his design problem may require.

The daylight factor measures indoor daylight as a percentage of daylight available under an unobstructed hemispherical sky. The standard is applied as a stated daylight factor at specific distances from floor and external wall and is then tested against a "permissive height indicator" which comprehends light penetrating either over the top of an obstruction in front of a window or from the side of that obstruction. The great flexibility in the technique is the credit it gives for light coming into a structure past the side of a building rather than over building tops alone.

A third technique would supplement the angle of light (which protects light in the street) by insuring light to all legally required windows in a building. The standard would be a wedge³⁹ consisting of radii of stated length, say 60 feet, projected from the center line of the window. The wedge encloses a stated angle, say 140 degrees, and ends in an arc. The wedge would be found in the space above some angle, such as 45 degrees, projected from the base of the window. The final element necessary is that the zoning ordinance specify for each district that amount and location of the space within the wedge which must be kept unobstructed. The designer is thus left with a real choice as to how he will so order building courts and walls to fulfill the light wedge requirements.

In multiple dwelling districts privacy is primarily a function of density levels. If they are effectively controlled, too close contact can be avoided. In low density areas, however, privacy is to an important extent governed by those controls which fix the placement of the dwelling on its lot. Minimum yard requirements thus operate in spheres other than light and air. The typical yard provisions place the house in the center of the lot. Outlook and inlook are in all directions.

It has been suggested⁴⁰ that central lot placement two hundred years ago would have caused no special loss of privacy for at that time efficiency dictated that all rooms be grouped around a central fireplace core. Small windows and few exposed wall surfaces helped keep down heat loss. The Cape Cod cottage was an appropriate solution. Today, however, this answer is anachronistic in view of perfected insulation and heating systems as well as double glazing.

The placement of the house could be made more flexible by abandoning yard requirements and using the floor area ratio or a less desirable "coverage" requirement which limits the percentage of the lot which the building may cover.

IV

ZONING FOR USABLE OPEN SPACE

Perhaps the most graphic example of what zoning might do for the city is caught

³⁹ See HARRISON, BALLARD AND ALLEN, *PLAN FOR REZONING THE CITY OF NEW YORK* 48-49 (1950).

⁴⁰ Agle, *A New Kind of Zoning*, *Architectural Forum*, July, 1951, pp. 176, 177, col. 3, p. 234, cols. 1, 2, 3.

in a hot summer night cityscape of a crowded neighborhood that has no air-conditioned movie, bar, or drugstore.

Zoning controls might assure the urban dweller of usable open space instead of mean strips of concrete of little use to anyone but alley cats. To answer the need assumes a definition of usability. These characteristics have been proposed:⁴¹ usable open space is only that part of the area of a residential lot at ground level which (1) is unoccupied by the principal or accessory buildings, (2) provides open space unobstructed to the sky of minimum prescribed dimensions, (3) is not devoted to service driveways or offstreet parking and/or loading space, etc., (4) is devoted to greenery, drying yards, recreational space, etc., and (5) is available to all occupants of the building.

This requirement, applied on a per dwelling unit basis, might be linked with the floor-area ratio. The per dwelling requirement would diminish as floor area ratio increases. Thus, since multiple dwelling families share open space in common, the amount of space needed by a family in a high density district at a given time can to some extent be provided out of a common pool of space. In low density areas away from the center of the city people forego proximity to central city advantages. Since they do this principally to have open space, there should be some legal insurance that the decision yields what it was assumed it would.

In low density districts only space at ground level or approximately there would be acceptable under the technique. In high density districts balcony and roof space could be given additional credit if they meet certain specifications. Because balconies in multi-story dwellings tend to be immediately accessible to each dwelling, they are preferable to open space on the ground or roof, at least for use by infants and the aged.

Since so little litigation has developed over issues of open space, it is not possible to extract detailed rules. Courts have scarcely mentioned what the functions of open space are and what open space controls they will uphold. To the extent it exists, authority deals generally with zoning problems principally involving minimum yard provisions and non-zoning problems principally involving building line regulations.

Little of the little that has been said about open space goes to the question of usability. These functions of open space controls have been treated by the courts: aesthetics;⁴² mitigation of traffic dangers;⁴³ mitigation of street dust, noise, and fumes;⁴⁴ reduction of the spread of fire and conflagration;⁴⁵ and assurance of access to light and air.⁴⁶

⁴¹ HARRISON, BALLARD AND ALLEN, PLAN FOR REZONING THE CITY OF NEW YORK 51-53.

⁴² *Gorieb v. Fox*, 274 U.S. 603 (1927).

⁴³ *Ibid.*

⁴⁴ *Ibid.*

⁴⁵ *Ibid.*; *Slack v. Building Inspector of Town of Wellesley*, 262 Mass. 404, 160 N.E. 285 (1928); *R. B. Const. Co. v. Jackson*, 152 Md. 671, 137 Atl. 278 (1927); *Wulfsohn v. Burden*, 241 N.Y. 288, 150 N.E. 120 (1925).

⁴⁶ *Gorieb v. Fox*, 274 U.S. 603 (1927); *Gordon v. The Board of Appeals of the City of Schenectady*, 131 Misc. 346, 225 N.Y.Supp. 680 (Sup. Ct. 1927); *R. B. Const. Co. v. Jackson*, 152 Md. 671, 137 Atl. 278 (1927).

The most relevant authority is indeed filamentary and is spun into a small handful of cases⁴⁷ none of which involves the suggested definition of usability and all of which touch the concept only by inference. As thin as the material is, however, it is likely that on the square issue of validity the usable open space technique would be sustained, for judicial opinion on all of these controls has been most receptive to intelligent new ventures in the field.

CONCLUSION

1. A fresh and inclusive caption is needed for zoning regulations of height, shape, and placement of buildings on the land which are applied to control population density, open space, and access to daylight and air.
2. Building technology and medical knowledge are flowing well in advance of zoning techniques. The disparity has checked the complete use of the resources of science and architecture and left the urban dweller with inadequate protection against overcongestion and diminished access to daylight, air, and open space.
3. Modern zoning techniques promise a fuller protection of those amenities. Many of the measures are as yet untested. Courts, which have until now been receptive to the ends and means of zoning, are likely to receive these recent proposals favorably.

⁴⁷ *Gorieb v. Fox*, 274 U.S. 603, 609 (1927) (comfort); *R. B. Const. Co. v. Jackson*, 152 Md. 671, 677, 137 Atl. 278, 281 (1927) (pleasure and comfort); *Pritz v. Messer*, 112 Ohio St. 628, 643, 149 N.E. 30, 35 (1925) (recreation); *Brett v. Building Commissioner of Brookline*, 250 Mass. 73, 79, 145 N.E. 269, 271 (1924) (recreation); *State ex rel. Morris v. East Cleveland*, 22 Ohio N.P. (N.S.) 549, 555, 31 Ohio Dec. 197, 203 (1920) (recreation).