ena of nature and mind; *i.e.*, just such a thesis as Kant had argued to be inadmissible. (*See* also IDEALISM: *Transcendental Idealism.*) (W. H. W.)

The New England Transcendentalists.—German Transcendentalism, especially as it was refracted by S. T. Coleridge and Thomas Carlyle (*qq.v.*), was one of several sources of thought to which the New England Transcendentalists turned in their search for a liberating idealistic philosophy. Platonism and Neoplatonism, the Indian and Chinese scriptures, and the writings of men like Swedenborg and Boehme were others. Eclectic and cosmopolitan in its sources and part of the Romantic movement, New England Transcendentalism was local in origin and effort, representing for its time not only a battle between the younger and older generations but a major rift in American culture.

The years 1830–55 were the period of the movement's most intense activity. Never united by a program, it comprised the various interests and labours of such figures as Ralph Waldo Emerson, Henry David Thoreau, Margaret Fuller, Amos Bronson Alcott, Theodore Parker, Orestes Brownson, Elizabeth Peabody, and James Freeman Clarke (*qq.v.*), as well as George Ripley, Christopher Cranch, Jones Very, Frederic Hedge, the younger W. E. Channing, and W. H. Channing. Common to all of them was a spiritual hunger: the need to find themselves one with the world, within a universe vitalized by the immanence of creative spirit. They wished to certify religion by means of experience and, in this, fell back on the Augustinian piety of their Puritan heritage. In experience they would overcome the disabling dualism and materialism of Lockean psychology and Newtonian physics, enjoy the sentiment of being as well as the accession to power with which to act on the world.

In their religious quest, the Transcendentalists undermined the inherited foundations of 18th-century thought; and what began in a dissatisfaction with Unitarianism developed into a repudiation of the entire established order. They were among the leaders and spokesmen of reform in church, state, and society, contributing to the rise of Free Religion, to the Abolitionist movement, to such communitarian experiments as Brook Farm and Fruitlands, to feminism, to educational innovation, and to other humanitarian causes. Among their most notable achievements was the demonstration of the aesthetic ways in which to appropriate native materials for a national culture. Emerson and Margaret Fuller founded *The Dial* (1840–44), the prototypal "little magazine"; and Emerson by his example and in his early address on "The American Scholar" defined a new "intellectual" set free from institutional bondage to think for society at large. The writings of the Transcendentalists, and those of contemporaries like Whitman, Melville, and Hawthorne, for whom they prepared the ground, represent the first flowering of the American genius and a permanent resource for an American tradition. Heavily indebted to the Transcendentalists' organic philosophy, aesthetics, and democratic aspiration have been the pragmatism of William James and John Dewey, the environmental planning of Benton MacKaye and Lewis Mumford, the architecture (and writings) of Louis Sullivan and Frank Lloyd Wright, and the American "modernism" in the arts that Alfred Stieglitz did so much to promote. *See* also AMERICAN LITERATURE: *American Renaissance (1829–70)*; and references under "Transcendentalism" in the Index.

BIBLIOGRAPHY.—For the Scholastic doctrine *see* A. B. Wolter, *The Transcendentals and Their Function in the Metaphysics of Duns Scotus* (1946). For German transcendental philosophy *see* works cited under KANT, IMMANUEL; and SCHELLING, F. W. J. VON. For New England *see* O. B. Frothingham, *Transcendentalism in New England* (1876); H. C. Goddard, *Studies in New England Transcendentalism* (1908); P. Miller (ed.), *The Transcendentalists: an Anthology* (1950); A. Kern, "The Rise of Transcendentalism," in *Transitions in American Literary History*, ed. by H. H. Clark (1953). (S. PL.)

TRANSCENDENTAL NUMBERS are real or complex numbers that are not algebraic (*see* NUMBER: *Algebraic and Transcendental Numbers*). Transcendental numbers are extremely numerous; while the set of all algebraic numbers is enumerable, that of all transcendental numbers is not. In the sense of H. L. Lebesgue, "almost all" real and complex numbers are transcendental. It is often difficult to decide whether a given number is transcendental; the problem is unsolved for such important numbers as e^e, $e + \pi$, and Euler's constant.

Simple sufficient conditions for the transcendency of a real number τ have been established. If there is a constant λ and infinitely many distinct pairs of integers $p,q > 0$ such that $0 < |\tau - \frac{p}{q}| < q^{-\lambda}$, then τ is transcendental if $\lambda > 2$, or $\lambda > 1$ and all qs have bounded prime factors. These tests show the transcendency of numbers like $\sum_1^\infty 2^{-2^n}$ and 0.149162536 . . . , but do not work with numbers like e or π since they specify only sufficient conditions. For the transcendency of any real or complex τ it is necessary and sufficient that, given any $\lambda > 0$, there exist an integer $n > 0$, and infinitely many distinct sets of $n + 1$ integers $a_0, a_1, \ldots, a_n$, such that $0 < |\sum^n a_k \tau^k| < a^{-\lambda}$, where

$$a = \max (|a_0|, |a_1|, \ldots, |a_n|) > 0$$

Numbers for which it is wished to decide the transcendency are usually given as values $\tau = f(\zeta)$ of an analytic function $f(z)$, where ζ is an algebraic number. The decision then depends on all the analytic, algebraic, and arithmetic properties of $f(z)$. Consider the following examples:

Let $\{P_n(z)\}$ be the sequence of all irreducible polynomials with integral coefficients; and let $\{a_n\}$ and $\{b_n\}$ be two sequences of positive integers tending very rapidly to infinity. Although the function $f(z) = \sum_1^\infty z^{a_n} P_1(z)P_2(z) \ldots P_n(z))^n/b_n$ is not algebraic, all values $f(\zeta), f'(\zeta), f''(\zeta), \ldots$ are algebraic if ζ is an algebraic number.

Let $f(z) = \sum_1^\infty [n\alpha] z^n$ where $\alpha > 0$ is a quadratic surd, and $[x]$ denotes the integral part of x; this function exists only for $|z| < 1$. If ζ is any algebraic number satisfying $0 < |\zeta| < 1$, all values $f(\zeta), f'(\zeta), f''(\zeta), \ldots$ are transcendental, and any finite number of them are algebraically independent.

e^ζ is transcendental if ζ is any nonzero rational number or any algebraic number. Since $e^{2\pi i} = 1$, the second result implies the transcendency of π. Hence it is impossible to square the circle by any finite construction with compass and ruler.

ζ^ω is transcendental if ζ and ω are algebraic, if $\zeta(\zeta - 1) \neq 0$, and if ω is irrational. In particular: if $f(z) = e^{2\pi iz}$, $f(\zeta)$ is algebraic if ζ is algebraic of degree 1, but is transcendental if ζ is algebraic of higher degree. If $j(z)$ is the modular function, and $\zeta = \xi + \eta i$ is an algebraic number satisfying $\eta > 0$, $j(\zeta)$ is algebraic if ζ is of degree 2, but is transcendental if ζ is of higher degree. If $J_0(z) = \sum_0^\infty \frac{(-z^2/4)^n}{n!\ n!}$ is the Bessel function of order 0, and $\zeta \neq 0$ is an algebraic number, $J_0(\zeta)$ and $J_0'(\zeta)$ are transcendental and even algebraically independent. *See* also NUMBERS, THEORY OF: *Diophantine Approximation.*

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TRANSCRIPTION, MUSICAL: *see* MUSICAL ARRANGEMENT.

TRANSEPT, in architecture, is a transverse section or portion of a hall or building, of considerable relative size, whose main dimension is at right angles to the long dimension of the building proper, thus developing a plan of either cruciform or T shape. In ecclesiastical architecture, it is the arms of the church, at right angles to the nave. At least two early Christian basilicas in Rome, St. Peter's and St. Paul's, were from the beginning provided with transepts, each taking the shape of a long, unbroken transverse hall whose length was equal to or extended beyond the combined width of nave and aisles and was separated from the nave by a great arch known as the triumphal arch. In the opposite wall an arch of similar size led into the apse.

The transept, however, constitutes no essential part of the architecture of the basilica (*q.v.*); it never occurred in the civil basilicas of ancient Rome. Though hardly a Christian invention, its