

# The effects of shift work on the lives of employees

*About 1 in 6 employees works other than regular days schedules, but data are scarce on how workers are affected; incomes may rise, but family routine, social life, and health often suffer*

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At least 10 million Americans are regularly engaged in shift work. According to data from the Current Population Survey,<sup>1</sup> which almost surely underestimates the prevalence of shift work,<sup>2</sup> nearly one worker in six was employed full time in 1978 during hours that differ from typical daytime schedules. There were 4.9 million nonfarm wage and salary workers on the evening shift, 2.1 million on the night shift, and 2.8 million on miscellaneous shifts.

The term "shift work" means different things to different people. Shift work is popularly regarded as work in which employees "shift" schedules on some regular basis from daytime to evening or nighttime. Many researchers define shift work as employment in which two or more groups of employees work at different times of a 17-hour or 24-hour time span, including a so-called "day" shift. Most discussions consider shift work to be any employment that regularly occurs between 7 p.m. and 7 a.m., the definition used in this study.

For a significant proportion of these employees, working after-dark hours may not only reduce satisfaction with their jobs but may also create troublesome problems for their health, family life, social activity, and

on-the-job safety. However, shift work provides unique benefits for many employees as well as proving advantageous in many ways for industry and for society at large. It is important for government policymakers, business leaders, and shift workers themselves to become familiar with the major effects that working evenings and nights may have on employees and their families, in order to consider ways to modify the features that are deleterious, while retaining or enhancing those that are beneficial. This study summarizes what is currently known about these effects, with principal attention focused on the harmful consequences that call for amelioration.

Most of the information in this article comes from original research studies of shift work from both inside and outside the United States. Secondary sources have also been examined. Anecdotal evidence from these sources about the personal experiences of shift workers and their spouses and children has been used to provide understanding of what the data mean in human terms.

There is limited evidence regarding many of the effects of evening and night work on employees. Furthermore, many of the data that have been reported are contradictory. A major American study of shift work concluded, "We have here the unhappy picture of a group of men doing something for their daily bread

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which they would prefer not to do if they had the opportunity to start over again." Yet an investigation of 600 English shift workers determined that "for subjective well-being in both its somatic and psychological aspects, shift work can in general probably hardly be called a problem."<sup>3</sup> These and similar conflicting research results represent in large measure a failure to control for numerous variables that may influence employee attitudes toward evening and night work including type of shift and work, job prestige, workplace amenities, age and marital status of shift workers and number and age of their children, neighborhood attitudes toward evening and night work, and the prevalence of night work in the community.<sup>4</sup> Despite this and other limitations in the research to date, there are a number of consistent findings regarding the advantages and drawbacks of shift work.

### Benefits

Some jobseekers accept shift work simply because there are not enough daytime jobs available.<sup>5</sup> For these individuals, evening and night work provides a unique source of gainful employment. Shift work's most alluring feature, however, appears to be its wage differential. According to the Bureau of Labor Statistics, these shift premiums average 10 cents an hour for the evening shift and 13 cents for the night shift.<sup>6</sup>

Shift work also enables workers to increase their income by moonlighting on daytime jobs. One study found that shift workers who did not wish to change shifts cited as their overriding reason the opportunity to hold a second job their current schedules provided. Significantly, 23 percent of night workers and 19 percent of evening workers held second jobs compared with 11 percent of daytime employees.<sup>7</sup>

Shift work provides another financial incentive rarely mentioned in the literature but frequently observed by the author. Although it has been pointed out that "the rapid expansion of service employment has . . . created many opportunities for part-time or intermittent work for young people whose main activity is pursuing their education,"<sup>8</sup> what has gone unnoticed is that many of these service jobs are during evening or night, enabling students to take courses during the day. Many security guards and nurse's aides, for example, use evening and night jobs to work their way through school and, not coincidentally, to provide a quiet environment in which they can spend some of their paid hours studying.

Shift work provides a number of nonpecuniary advantages for some workers. Working evenings or nights allows employees more free time during the day and, in the case of rotating shift work, to accumulate several days off in a row on a regular basis. Some workers enjoy a variety of rotating shifts, while others appreciate being able to remove themselves from unwanted family

situations or responsibilities. The camaraderie and sense of loyalty that is a feature of certain evening or night-time occupations can be a satisfying substitute for or addition to normal social and family life.<sup>9</sup>

Many shift workers have less tension and a more relaxed pace on the night shift than during the day because of less supervision or fewer interruptions from clerical or management personnel. Finally, shift work accommodates "night owls," who function poorly in the morning and best during evening or night.<sup>10</sup>

### Drawbacks

The attractions of shift work are considerable for many individuals. But the benefits must be weighed by shift workers and policymakers alike against the drawbacks that affect the health, interpersonal relationships, leisure time activities, and perhaps the safety of a large proportion of shift workers. The central feature of shift work that creates dissatisfaction for many evening and night workers is that it puts them "out of rhythm" with their minds and bodies, families and social lives, and routines of the rest of the community.

*Health.* There is a well-documented circadian (24-hour) rhythm that governs many of the major biological functions of the human body. Disturbance of these cycles is responsible for several of the most upsetting physical and emotional problems evening and night workers experience. Diurnal rhythms control pulse, blood pressure, the cardio-pulmonary system, blood composition, endocrine secretions, appetite, elimination, and the wake-sleep cycle.<sup>11</sup> Shift work, of necessity, interrupts these processes and requires that they occur at times for which the body is not genetically programmed or environmentally conditioned for them.

There is disagreement over the extent to which the body, over time, can adapt to changes in these rhythms. Although several studies have found rhythmic adjustments to a new work schedule may occur within four days to two weeks,<sup>12</sup> several considerations suggest that such ready adaptation may not be commonplace. A significant minority of shift workers, for unknown reasons, never significantly adjust, biologically, to the alterations imposed on their normal body cycles. In addition, most evening and night employees in the United States are on rotating shifts. The continuous alteration of day and evening; or day, evening, and night work, seriously diminishes or entirely precludes adjustment of bodily rhythms. Furthermore, any adaptation that may be achieved even among fixed shift workers is repeatedly undermined by days off, holidays, vacations, and sick leave, when employees revert to normal living schedules.<sup>13</sup> Not surprisingly then, problems related to sleep, appetite, and digestion are the most common and persistent complaints for many shift workers.

Particularly widespread among shift workers is insufficient or poor quality sleep resulting from trouble falling asleep, waking during sleep, and waking up early. Although many of these difficulties are from disruptions in the body's normal diurnal sleep rhythms, sleep during daytime is also often disturbed by excessive and unavoidable light and heat, and by noises from children, housework, telephone calls, and street traffic. "Have you ever gone home in the morning after a night's work," one shift worker asked rhetorically, "when the sun is shining and a bed awaits you with the blinds tightly drawn to keep out the light—are you going to sleep?"<sup>14</sup> Sleep can also be unsettled by over-fatigue, restlessness, and tension. As she began preparing dinner at midnight for her husband who was coming home from the evening shift at a local factory, a woman observed, "It always takes a couple of hours to calm him down. We never get to bed before 4."<sup>15</sup>

Lack of adequate sleep and poor quality sleep have been implicated in a number of adverse health and safety consequences, including physical disorders, nervous problems, and deficits in mental and psychomotor performance which can lead to on-the-job accidents. Fatigue is the most commonly encountered and upsetting reaction shift workers experience from sleep deprivation. This is particularly true of night and rotating shift workers. The latter are often required to work emergency overtime without notice, an added burden on an already tiring schedule. Fatigue can have a number of harmful consequences besides those for health, including impaired ability to participate in family and social life during the hours when a shift worker is not at work.<sup>16</sup>

Loss of appetite and irregular eating habits are a common occurrence among shift workers that may lead to weight loss as well as nutritional deficiency. "One week you have dinner at 4 p.m.; the next week you have it at 11:30 p.m. You don't feel like anything at 11 o'clock at night," a rotating shift worker commented.<sup>17</sup> Shift workers also experience more digestive problems. Forty-three percent of 150 shift workers in one study reported taking some form of medication for digestive problems.<sup>18</sup> There is conflicting evidence regarding whether shift workers have higher rates of stomach disorders, including ulcers, colitis, and gastritis, than do day workers.<sup>19</sup>

There is also little agreement regarding the pervasiveness or severity of shift work's impact on employees' emotional well-being. However, some shift workers report feeling guilty at not being able to spend time with their families due to conflicting schedules or fatigue when they are at home.<sup>20</sup> Shift workers may also feel disparaged because of the social stigma toward shift work that appears to be prevalent in many countries. One study found that nonsupervisory night workers in a

state mental hospital and an electronics plant attributed less prestige to their own jobs than did day workers doing the same job. The daytime workers in another plant regarded the company's night workers as "odd."<sup>21</sup>

*Family.* Shift workers experience more family-related problems than do daytime employees because of the lack of synchrony between their hours on the job and their families' daily routines. The most serious family disturbance is that many people who work evenings and nights are less able to spend time with their children, especially small children who go to bed early, than are employees who work during the day.<sup>22</sup>

The time shift workers have to spend with their spouses can also be severely curtailed by hours of work, because a shift worker's wife or husband who works during the day or not at all is often awake at precisely those times when the shift worker must sleep. Spouses who wish to spend time with a mate who works during the evening or night usually have to alter their patterns of sleep, mealtime, and recreation to accommodate the shift worker's atypical schedule.

The time that shift workers spend with their families may prove less satisfying than it could be because the worker's fatigue from poor sleep or lack of sleep can prevent normal social activity. An interstate rig operator commented that the wife of a long-distance trucker "can't even count on her husband to attend a graduation, a communion, any kind of social function. He's usually so darn tired that he'd much rather be home sleeping than getting ready to go out Sunday night." Families may have difficulty just keeping track of the schedule of a shift worker in the family and knowing when the worker will be available for meals, social activities, or special events. Many wives of shift workers have also reported being frightened staying home alone at night without a man available to afford a feeling of protection. Sexual activity is still another aspect of family life that is sometimes disrupted by shift work.<sup>23</sup>

Curiously, there is little difference among evening, night, and day workers regarding frequency of visits with relatives outside the immediate family.

*Social life.* Evening and night work does not appear to interfere significantly with how often shift workers visit friends, but it does deprive at least some shift workers of extensive friendships. "Sometimes at 11 o'clock at night I feel sorry for myself," a junior foreman on a rotating shift related. "If you work shift work, you don't have any friends. They don't know whether you are sleeping or working . . . . You have an invite out and find you are working on the evening shift and you can't go." The wife of an air traffic controller reported that her husband's shifts, which change weekly, made it difficult for her to plan anything in advance. "We have to

have friends who are in the same boat as we are." Also, shift workers participate in fewer voluntary organizations than daytime workers. The same junior foreman complained, "The school PTA meets and stuff like that goes on in the evenings and I . . . can't go."<sup>24</sup>

*Safety.* Although disagreement and lack of evidence predominate regarding the effects of evening and night work on employee safety, there are sound physiological grounds for presuming an increased rate of accidents at night based on laboratory studies of efficiency and errors related to circadian rhythms. Laboratory studies of speed, reaction time, and accuracy show demonstrable deficiency after the evening hours begin. Biologists say it is no coincidence that the human errors which led to the nuclear energy accident at Three Mile Island occurred at 4 a.m. by workers who had been changing shifts every week.<sup>25</sup> Some studies also report that workers on night shifts make more mistakes than day shift employees and that this is particularly true for rotating shift workers. By contrast, one investigation of occupational safety concluded that "there are no more accidents at night than there are during the day," and

another study found that only the rate of serious accidents is higher at night. A study of three factories with rotating shift workers showed no statistically significant differences in the accident rates between day and night workers, but the authors pointed to possible confounding of the data because night workers are usually less inclined to seek medical aid for minor injuries.<sup>26</sup>

ONLY A PARTIAL PICTURE of the effects of shift work on employees can be drawn with the information currently available. Clearly, additional research is needed. Furthermore, any decisions about how to enhance the positive features and eliminate the harmful aspects of shift work must reflect the significant advantages evening and night work provides to industry and to society at large. Nonetheless, the evidence that shift work appears to impair the health, domestic life, and social activities of millions of workers and their families indicates that more effort needs to be devoted now by government, industry, organized labor, the local community, and shift workers themselves toward ameliorating these widespread, harmful consequences of evening and nighttime employment. □

— FOOTNOTES —

<sup>1</sup> See Janice Neipert Hedges and Edward S. Sekscenski, "Workers on late shifts in a changing economy," *Monthly Labor Review*, September 1979, pp. 14-22.

<sup>2</sup> The Current Population Survey provides information only on the starting and ending times for full-time workers in its sample population. As a result, the survey omits dual jobholders who work an evening or night shift on a second job, shift workers who are employed fewer than 35 hours a week, and most importantly, employees who are on the day segment of a rotating shift during the reference week of the survey. Given these limitations, the figure of 10 million shift workers in the country underestimates their actual prevalence to an unknown but probably considerable extent. See "Workers on late shifts . . ." pp. 14-22, and Donald L. Tasto and Michael J. Colligan, *Shift Work Practices in the United States* (Washington, The National Institute for Occupational Safety and Health, 1977). Another estimate places the percentage of shift workers at over one-fourth the entire national work force. See Phyllis Lehmann, "The National Institute for Occupational Safety and Health: Expanding the Frontiers of Knowledge," in Judson MacLaury, ed., *Protecting People at Work* (Washington, U.S. Department of Labor, 1980).

<sup>3</sup> See Floyd C. Mann and L. Richard Hoffman, *Automation and the Worker* (New York, Henry Holt and Co., 1960) and J. M. Dirken, "Industrial Shift Work: Decrease in Well-Being and Specific Effects," *Ergonomics*, March 1966, pp. 115-24.

<sup>4</sup> The influence of community attitudes and work schedules in the occupational and off-the-job satisfaction of shift workers has been convincingly documented in Randall B. Dunham, *Community Structure and the Experiences of Shift Workers*, prepared for the U.S. Department of Labor, Employment and Training Administration, (Springfield, Va., National Technical Information Service, 1979).

<sup>5</sup> See John D. Owen, *Working Hours: An Economic Analysis* (Lexington, Mass., D.C. Heath and Co., 1979), p. 65, William Grossin, *Le Travail et le Temps* (Paris, Editions Anthropos, 1969), and Alan P. Henry, "Our New Pioneers," *The Boston Globe*, June 15, 1979.

<sup>6</sup> See Charles M. O'Connor, "Late-shift employment in the manufacturing industries," *Monthly Labor Review*, November 1970, pp. 37-42, and *Shift Work Practices* . . . p. C-2. Shift premiums, however,

have tended to rise less than the general wage rates over the last several years. See "Workers on late shifts . . .," p. 17. Furthermore, it may be that only those shift workers with little experience or education earn more than daytime workers of similar qualifications while among those with higher levels of experience and education, daytime employees may receive the higher wage. See *Working Hours* . . . p. 87. For evidence documenting the appeal of wage differentials, see *Working Hours* . . . p. 64, Mann and Hoffman, *Automation and the Worker*, pp. 136-37, James H. Downie, *Some Social and Industrial Implications of Shift Work* (London, Industrial Welfare Society, Robert Hyde House, 1963), Marc Maurice, *Shift Work* (Washington, International Labor Office, 1975), p. 68, and Paul E. Mott, Floyd C. Mann, Quin McLoughlin, and Donald P. Werwick, *Shift Work: The Social, Psychological and Physical Consequences* (Ann Arbor, University of Michigan Press, 1965).

<sup>7</sup> *Shift Work: The . . . Consequences*, pp. 24, 318. The moonlighting opportunities shift work provides are discussed in Maurice, *Shift Work*, p. 68, *Shift Work: The Consequences*, pp. 304-05, 310, and J. Carpentier and P. Cazamian, *Night Work* (Washington, International Labor Office, 1977).

<sup>8</sup> Eli Ginzberg, *Good Jobs, Bad Jobs, No Jobs* (Cambridge, Mass., Harvard University Press, 1979), p. 17.

<sup>9</sup> On free time, see Maurice, *Shift Work*, pp. 66-67, A. A. I. Wedderburn, "Social Factors in Satisfaction with Swiftly Rotating Shifts," *Occupational Psychology*, 1967, pp. 85-107. On consecutive days off, see, for example, "Social Factors . . .," in *Night Work*, p. 309, and *Shift Work: The . . . Consequences*, pp. 309, 312. On the stimulation of rotating shifts, see "Social Factors in Satisfaction . . ." On removal from the family, see Jadwiga Wojtczak-Jaroszowa, *Physiological and Psychological Aspects of Night and Shift Work* (Washington, U.S. Government Printing Office, 1977), p. 43. On camaraderie, see *Some Social and Industrial Implications* . . . , pp. 8, 10, Joan Aldous, "Occupational Characteristics and Males Role Performance in the Family," *Journal of Marriage and the Family*, November 1969, pp. 707-12, Rosabeth Moss Kanter, *Social Science Frontiers* (New York, Russell Sage Foundation, 1977), p. 33, and Seymour Martin Lipset, James Coleman, and Martin Trow, *Union Democracy* (New York, The Free Press, 1956), pp. 136-39.

<sup>10</sup> On night shift pace, see *Night Work*, p. 52, *Union Democracy*, p. 139, *Shift Work*, p. 63, and Gwynneth De La Mare and J. Walker, "Factors Influencing the Choice of Shift Rotation," *Occupational Psychology*, January 1968, pp. 1–21. On "night owls," see *Night Work*, p. 35, *Shift Work*, p. 62, and Torbjorn Akerstedt, "Shift Work and Health—Interdisciplinary Aspects," in U.S. Department of Health, Education, and Welfare, *Shift Work, and Health: A Symposium* (Washington, D.C., U.S. Government Printing Office, 1976), pp. 179–197.

<sup>11</sup> *Night Work*, p. 14, *Shift Work: The . . . Consequences*, pp. 9–10, Maurice *Shift Work*, p. 48, *Physiological and Psychological Aspects . . .*, pp. 3–12.

<sup>12</sup> *Shift Work*, p. 25, *Shift Work: The . . . Consequences*, p. 312, *Physiological and Psychological Aspects . . .*, p. 7, and W.P. Colquhoun, "Circadian Rhythms, Mental Efficiency, and Shift Work," *Ergonomics*, September 1970, pp. 558–60.

<sup>13</sup> "Circadian Rhythms . . .", pp. 558–60, *Shift Work*, p. 45, *Shift Work: . . . The Consequences*, pp. 280, 312, *Night Work*, p. 17, J. H. Van Loon, "Diurnal Body Temperature Curves in Shift Workers," *Ergonomics*, June 1963, pp. 267–73, and S. Wyatt and R. Marriott, "Night Work and Shift Changes," *British Journal of Industrial Medicine*, July 1953, pp. 164–72.

<sup>14</sup> *Some Social and Industrial Implications . . .* p. 18. On the prevalence and nature of sleep disturbances, see *Shift Work*, p. 44, *Automation and the Worker*, pp. 107, 114–15, *Shift Work: The . . . Consequences*, pp. 10, 290, 300, *Night Work*, pp. 22–24, Harry Levinson, Charlton R. Price, Kenneth J. Munden, Harold J. Mandl, and Charles M. Solley, *Men, Management, and Mental Health* (Cambridge, Mass., Harvard University Press, 1962), and Donald L. Tasto, Michael J. Colligan, Eric W. Skjei, and Susan J. Polly, *Health Consequences of Shift Work* (Cincinnati, Ohio, National Institute of Occupational Safety and Health, 1977).

<sup>15</sup> See Barbara Garson, *All the Livelong Day: The Meaning and Demeaning of Routine Work* (New York, Penguin Books, 1977), pp. 92–93.

<sup>16</sup> On the effects of inadequate sleep on health see *Night Work*, p. 18, *Shift Work*, p. 46, *Physiological and Psychological Aspects . . .*, p. 41. On fatigue, see *Shift Work: The . . . Consequences*, p. 300, *Physiological and Psychological Aspects . . .*, p. 41, *Night Work*, p. 24, *Shift Work*, p. 67, and Wyatt and Marriott, "Night Work and Shift Changes." On the imposition of sudden, mandatory overtime, see *Some Social and Industrial Implications . . .*, p. 6, *All the Livelong Day . . .*, pp. 92–93, "Social Factors in Satisfaction . . ." For fatigue's effects on safety, see *Some Social and Industrial Implications . . .*, p. 17. For the effects of fatigue on family life, see footnote 23. Curiously, afternoon shift workers have been known to complain that they may get too much sleep, since they can usually retire before midnight and need not get up again until the following afternoon. See, for example, *Shift Work: The . . . Consequences*, p. 305. In one study of two evening worker groups, 32 out of 49 workers in one sample and 44 out of 54 workers in the other sample got nine or more hours of continuous sleep a night. See J. Walker, "Frequent Alternation of Shifts on Continuous Work," *Occupational Psychology*, October 1966, pp. 215–25.

<sup>17</sup> *Some Social and Industrial Implications . . .*, p. 11.

<sup>18</sup> See "Night Work and Shift Changes." See also, *Automation and the Worker*, pp. 107, n. 4, 114–15, *Shift Work: The . . . Consequences*, pp. 236, 300. *Health Consequences of Shift Work*, p. 8.

<sup>19</sup> See, for example, *Shift Work: The . . . Consequences*, p. 301, *Shift Work*, p. 44, *Automation and the Worker*, p. 120, "Night Work and Shift Changes," *Health Consequences of Shift Work*, p. 9, and "Shift Work and Health—Interdisciplinary Aspects," p. 181.

<sup>20</sup> *Shift Work: The . . . Consequences*, p. 290, *Men, Management, and Mental Health*, p. 108, and Al Nash, "Job Satisfaction: A Critique," in B. J. Widick, ed., *Auto Work and Its Discontents* (Baltimore, Md., The Johns Hopkins University Press, 1977), p. 79.

<sup>21</sup> See Ronald H. Bohr and Arnold B. Swertloff, "Work Shift, Occupational Status, and the Perception of Job Prestige," *Journal of Applied Psychology*, June 1969, pp. 227–29 and "Factors Influencing the Choice . . ." For a discussion of the stigma against shift work, see Henry, "Our New Pioneers" and J. D. McDonald, "The Social and Psychological Aspects of Night Shift Work," unpublished Ph.D. thesis, University of Birmingham (England), 1958, cited in David Brown, "Shift Work: A Survey of the Sociological Implications of Studies of Male Shiftworkers," *Journal of Occupational Psychology*, December 1975, pp. 231–40.

<sup>22</sup> See Joseph L. Kearns, *Stress in Industry* (London, Priory Press Ltd., 1973), p. 63. See also *Men, Management, and Mental Health*, p. 108, "Job Satisfaction: A Critique," p. 79, *Health Consequences of Shift Work*, pp. 12–15, *Shift Work*, p. 52, *Union Democracy*, p. 137, *Automation and the Worker*, p. 121, *Some Social and Industrial Implications . . .*, p. 15, and Chaya S. Piotrkowski, *Work and the Family System* (New York, the Free Press, 1979), p. 69.

<sup>23</sup> The truck driver is quoted in Studs Terkel, *Working* (New York, Avon Books, 1975), p. 285. On the effects of shift worker fatigue on family life, see *Shift Work: The . . . Consequences*, p. 288. Wives' fear of being alone at home is discussed in *Some Social and Industrial Implications . . .*, p. 13, "Factors Influencing the Choice . . .", "Shift Work and the Shorter Workweek," in Clyde E. Dankert, Floyd C. Mann, and Herbert R. Northrup, eds., *Hours of Work* (New York, Harper and Row, 1965), p. 119 and *A Survey of the Sociological Implications*, pp. 231–40. Shift work's effects on sexual activity are described in *Shift Work: The . . . Consequences*, pp. 19, 95, 111–12.

<sup>24</sup> The quotations are from *Men, Management, and Mental Health*, p. 107, and "A Traffic Controller's Life and Death Job," *The Boston Globe*, April 12, 1981. See also *Shift Work: The . . . Consequences*, pp. 181 and 299, *Shift Work*, p. 55, *Automation and the Worker*, p. 124, *Some Social and Industrial Implications . . .*, p. 7, *Union Democracy*, p. 137, and Martin Reiser, "Stress, Distress, and Adaptation in Police Work," in William H. Kroes and Joseph J. Hurrell, Jr., eds., *Job Stress and the Police Officer: Identifying Stress Reduction Techniques*, proceedings of a symposium, Cincinnati, Ohio, May 8–9, 1975, U.S. Department of Health, Education, and Welfare (Washington, U.S. Government Printing Office, 1975), pp. 19–20.

<sup>25</sup> On laboratory studies of efficiency and errors, see "Circadian Rhythm . . .", pp. 558–60, W. P. Colquhoun, "Accidents, Injuries and Shift Work," in *Shift Work and Health*, U.S. Department of Health, Education, and Welfare (Washington, D.C., U.S. Government Printing Office, 1976), pp. 160–97, and *Physiological and Psychological Aspects . . .*, p. 27. The biologists' comments on the Three Mile Island accident are cited in Dianne Hales, "Temperature Pills," *Family Health*, September 1980, p. 9. Studies of on-the-job mistakes are reported in *Health Consequences of Shift Work*, pp. 10, 75.

<sup>26</sup> Evidence that fails to confirm a relationship between shift work and job safety may be found in "Accidents, Injuries and Shift Work," *Night Work*, p. 25, and "Night Work and Shift Changes."