TYPES OF ROCK CLIMBING • GEAR • CLIMBING EFFICIENTLY • BASIC TECHNIQUES • FACE CLIMBING • CRACK CLIMBING • OTHER CLIMBING TECHNIQUES • STYLE AND ETHICS • BEING PREPARED

CHAPTER 12
ALPINE ROCK CLIMBING

Alpine rock climbing can range from moderate routes only a few hours from the trailhead to multiday climbs in remote settings. Rock climbing provides the kinesthetic pleasure of movement combined with the challenge of solving a three-dimensional puzzle on intriguing landforms.

This chapter focuses on the basic and intermediate-level rock climbing skills needed in the mountains. For those interested in a sport-climbing emphasis, see Resources for several excellent texts on techniques more suited to that environment.

Note: When rock climbing on technical terrain, you should always be on belay. However, to more clearly show body positions involved in different climbing techniques, the illustrations in this chapter omit components of the basic safety system such as ropes, harnesses, and protection.

TYPES OF ROCK CLIMBING

Technical climbing begins when the party's safety requires the use of anchored belays. *Free climbing* is simply climbing using your own physical

ability to move over the rock via handholds and footholds, with the rope and protection used only for safety. This is in contrast with *aid climbing*, which involves the use of artificial aids to make upward progress, such as protection placed in the rock for use as hand- and footholds. Climbers use aid technique (see Chapter 15, Aid and Big Wall Climbing) if the rock does not offer enough natural features or if the route is too hard for their skill level. *Big wall climbing* means climbing on—what else?—a large, sheer wall, which usually requires extensive aid, but frequently these wall routes include sections of free climbing. Ascents of big walls typically take longer than one day, usually including either a hanging bivouac or ledge bivouac as well as bag hauling. *Solo climbing* is, of course, climbing alone, but it usually refers to unroped climbing (called *free soloing*); a climber can also *rope-solo* a route, using gear, and so self-belay on a solo free or aid climb.

A climb is rated by its most difficult portion. Nontechnical climbs, or *scrambles*, occur on second-, third-, or even fourth-class terrain (see Appendix: Rating Systems). Note that "third-classing" a climb also means to do it unroped. Portions of a long route may be considerably easier than the route's overall rating, perhaps even second class. Depending on the skills and experience of the climbers and the condition of the routes, some easier sections may be climbed unroped, walked while the rope is coiled short (see "Climbing in Coils" in Chapter 14, Leading on Rock), or climbed with a running belay (using a technique called *simul-climbing*; again, see Chapter 14). This compromise of safety is often made to gain the speed necessary to climb a longer route in a shorter period of time with less gear. For experts, these easier sections may be as hard as midfifth class, despite the potential for fatal consequences should a climber fall.

Although experienced climbers occasionally free-solo a route, all unroped climbing is risky. The risk depends on not only how likely a climber is to fall but what the consequences of a fall would be. Is the rock loose? Is it raining, which makes the rock slippery? Could a climber be hit by rockfall—or by a climber falling from above—and thereby be knocked off the holds? Is the ground 10 feet (3 meters) below or several hundred feet? Fatal falls have occurred on third-class terrain as well as on 5.12 routes.

Sport climbing and crag climbing are two types of free climbing that refer to technical rock climbs close to roads and civilization that do not require alpine skills. To the mountaineer who climbs distant peaks in the wilderness, sport and crag climbing might be viewed as ways to practice the technical,

physical, and mental aspects of rock climbing in a less remote, relatively lower-risk environment—for example, where help is usually more accessible in the event of an accident.

In contrast to a traditional climb, or *trad climb*, in which climbers place and remove rock protection, *sport climbing* involves routes where bolts have been previously drilled into the rock face for protection. The emphasis is on each climber pushing personal physical limits in terms of gymnastic ability, physical strength, and endurance. For more information on sport climbing, refer to books in Resources, and seek out instruction in the proper techniques for falling while on lead, belaying a climber on lead who is expected to fall, and assessing the safety of falling on a given route.

Crag climbs generally require placement of traditional rock protection in cracks in the rock face. However, entire routes or sections of routes with extensive face climbing and little opportunity for traditional protection placements may be bolted. Lead falls taken on bolts or traditional rock gear while crag climbing are not necessarily safe; carefully assess each route's risk compared with the level of risk you are willing to accept and the likelihood of falling, compounded by the consequences of such a fall. Crag routes vary widely in length, ranging from one to more than 15 pitches. Some have bolts for belay and rappel anchors, whereas others require that climbers build an anchor for belaying or that they walk or scramble down for the descent.

Alpine rock climbing refers to routes farther from civilization that require many of the technical, physical, and mental aspects of rock climbing involved in sport and crag climbing, in addition to alpine routefinding or glacier climbing skills and equipment. Alpine routes are almost never bolted.

Of course, all these categories have some overlap. For example, some multipitch bolted climbs are in somewhat remote areas.

GEAR

Ropes and harnesses are covered in Chapter 9, Basic Safety System; protection hardware is covered in Chapter 13, Rock Protection.

FOOTWEAR

On rock climbs of easy difficulty, the same boots climbers wear on the approach generally work well for the actual climbing. (For more information

on mountaineering boots, see Chapter 2, Clothing and Equipment.) When the climbing is more difficult, specialized footwear—rock shoes (fig. 12-1a, b, and c)—give a significant advantage. Most rock shoes have flexible uppers, plus smooth, flexible soles and rands of sticky rubber. These soles create excellent friction when weighted on rock, allowing purchase on angles and nubbins that can amaze the beginning climber.

On a climb that is a carryover—climbers do not go back to their starting point or base camp on the way down—using rock shoes on the route means climbing with the weight and bulk of boots in their pack. If the climbing includes patches of snow or ice between the rock sections, wearing boots for the entire route avoids time-consuming breaks for changing footwear. Some advanced climbers climb through short sections of snow with rock shoes, or one climber leads the rock pitches in rock shoes and the other climber leads the mixed pitches of rock, snow, and ice in boots. For difficult rock climbing, especially narrow cracks, the better purchase and thinner profile afforded by rock shoes may make for safer and faster climbing. The choice of footwear and pack is personal and depends on the route. Climbing in mountaineering boots is more common on alpine rock routes without technically difficult rock sections. Rock shoes are used on more technical rock terrain, usually rated 5.6 or harder, when crack climbing is required.

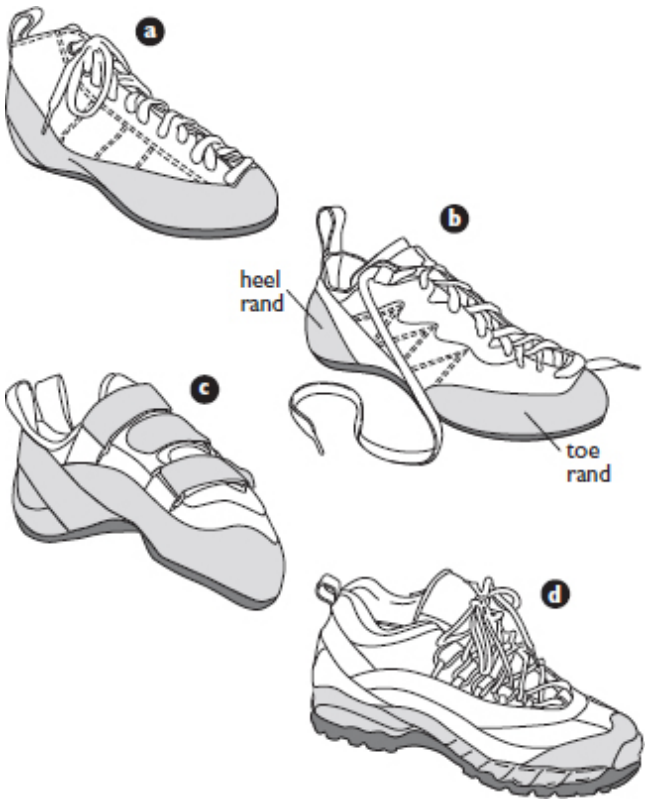

Fig. 12-1. Rock shoes: a, all-around shoe (flat last); b, more specialized edging shoe; c, Velcro-closure slipper (cambered last); d, combined approach and climbing shoe.

Approach shoes (fig. 12-1d) are a compromise between mountaineering boots and rock shoes. These are useful when the approach is snow free, and they can be worn on the climb itself if the route is of moderate difficulty. To avoid the burden of carrying boots on a sustained rock climb, some experienced climbers strap crampons onto running shoes for short snow crossings, such as a small pocket glacier.

When choosing an appropriate pair of rock shoes, climbers can find the confusing array at outdoor stores daunting. Remember that climbing technique is far more important than the shoes! Specifically, until you have mastered the techniques necessary to climb at the 5.10 or 5.11 level and beyond, your choice of rock shoe will likely not make a significant difference. That said, below are some useful guidelines on rock-shoe selection.

Stiff-soled, more cambered shoes are better at edging (see Figure 12-1b); flexible shoes are better at frictioning or smearing (see "Footholds" later in this chapter). Shoes with laces, such as in Figure 12-1a and b (as opposed to laceless "slippers" in Figure 12-1c), and higher tops that cover the anklebones (as in Figure 12-1a) offer protection when climbers jam their feet

in cracks. If a climber is restricted to owning only one pair of rock shoes, a pair with all-around characteristics is best.

Good fit is paramount. Rock shoes should fit snugly, to allow dexterity and a good sense of the rock's features, yet not so tightly as to cause pain. Rock shoes should be comfortable enough to wear for an all-day climb. Unlike sport climbers at local crags, crag and alpine rock climbers do not have the luxury of taking their shoes off after each 40-foot (12-meter) pitch. Some makes of rock shoes are sized for wider or narrower feet than others; try on different styles to find what fits. A thin pair of liner socks add comfort and a little warmth, a bonus when climbing in chilly conditions. Some climbers have a pair of "alpine rock shoes" sized to fit over their mountain-boot socks. All rock shoes stretch somewhat, usually only a quarter to a half size in width and much less in length. Leather shoes stretch more than synthetic shoes. Lined shoes stretch the least.

Rock-shoe rubber oxidizes and hardens over time; try a brisk scrubbing with a wire brush to expose a new, stickier layer. Rock shoes can often be resoled when their rubber wears down but usually only if a hole has not yet been worn through. Resoling is significantly less expensive than buying a new pair.

CLOTHING

Alpine rock climbing clothing must be comfortable, allow free range of movement, and handle changing weather conditions. For details on fabrics and general information on alpine clothing, see Chapter 2, Clothing and Equipment.

Remove rings, bracelets, and watches before climbing rock, because they will probably get scratched at the very least; much worse, they may catch in a crack and damage your hands. A stuck ring can cause serious injury, even amputation of the finger.

TAPE

Athletic tape can be used to protect hands from abrasive rock when you are crack climbing. Tape is advisable for those learning crack techniques, for those climbing more difficult cracks (especially on rock that has many sharp crystals), or for those who have occupations where raw hands could be a hazard (such as health care or food service). Some climbers feel that tape around their fingers helps support and protect finger tendons.

Taping methods vary; see Figure 12-2 for a method that leaves the palm untaped, to ensure sensitivity while face climbing. When taping your hands, flex them so that when you later make a fist or hand jam, the tape will not be too tight. After climbing, you can often cut off your tape "gloves" and save them for later use.

CHALK

Climbers chalk can improve a climber's grip, especially in hot weather, by absorbing sweat. Chalk is available as loose powder and as a crushable block, either of which climbers usually carry in a chalk bag. Chalk is also available contained inside mesh balls (refillable) that allow smaller amounts of chalk to sift out into the chalk bag and minimize spillage.

Chalk marks tend to identify the holds that are used, thus making a climber's moves obvious and minimizing the adventure for the next climber. Excess chalk on holds makes them slippery and leaves residue on the rock, which affects other users. Use chalk sparingly, especially in sensitive or heavily used areas.

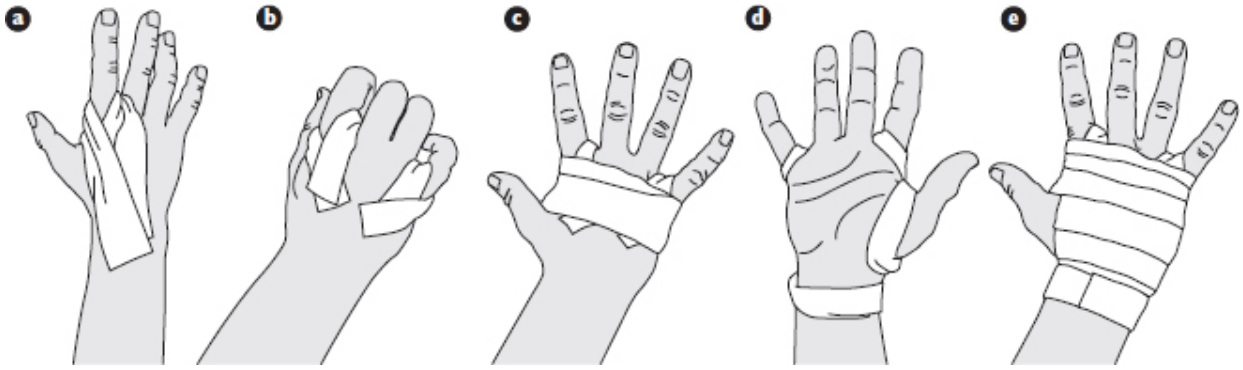

Fig. 12-2. Hand taped for climbing: a, wrap tape around first finger; b, wrap tape around pinky; c, cover back of hand with overlapping tape strips; d, palm is left mostly open; e, add wraps down to wrist to protect entire back of hand.

CLIMBING EFFICIENTLY

Efficient technique makes alpine rock climbing more enjoyable. It enables climbers to ascend with as much speed as is reasonable, without exhaustion. Climbers must have enough strength for the approach and the climb itself, as well as the descent and the hike back out. Good technique combines balance, footwork, and handwork with the minimum expenditure of strength. Climbing

efficiently also requires proficiency with technical gear by both the leader and follower (described in Chapters 13, Rock Protection, and 14, Leading on Rock). All of this comes with time and practice.

Rock climbing may appear to require great arm strength. It is true that strength may get climbers up certain rock sections if they have no technique, but they will also burn out quickly. On some rock features, strength alone will not work; technique is necessary. The best of both worlds combines technique with good physical training in strength, power, and endurance (see Chapter 4, Physical Conditioning; Eric Hörst's *How to Climb 5.12* is also a good resource for physical training, listed in Resources). Following are some general guidelines about technique that apply to climbing any type of rock, whether a face or a crack.

FOCUS ON SPEED AND SAFETY

Speed is often an important part of safety on an alpine rock climb. Less time climbing means less time exposed to rockfall and changing weather, as well as more time to solve routefinding problems, deal with injury, get off the mountain before dark, or handle any number of possible risks inherent in the alpine environment. However, reasonable caution must not be sacrificed to speed. Practice on shorter, easier routes and move to longer, more difficult routes as your efficiency improves.

Aim to move smoothly over the rock and set up belays, exchange gear, and manage the rope with a minimum of wasted time. Alpine rock climbing often necessitates carrying a pack, and choices regarding packs depend on the route and personal preference. Pack enough gear to do the climb and survive unexpected situations, but be spartan. Depending on the situation, for speed and safety, both climbers in a climbing team may choose to carry similar packs, or the follower might carry either the only pack or the larger one.

Keep small snacks and water readily accessible for nibbling or sipping in a few seconds at a belay station. Many a climber has "bonked" while up high: gotten dangerously tired and slow from inadequate nutrition or hydration during the day. Be aware of your own—as well as your partner's—food and water intake and energy levels.

The size of the climbing party and the number of rope teams affect overall trip speed. The more rope teams there are, the longer it will take for the entire party to finish, all else being equal.

CLIMB WITH YOUR EYES

Observe the rock. See where the holds are—the edges, the cracks—before even setting foot on the rock. Obviously, specifics of the entire pitch cannot be visually memorized beforehand, but it is possible to get an overall idea. Look off to the side as well as up and down while climbing, to continually check where the holds are and will be in relation to your hands and feet. Many choices of holds are available on easy to moderate routes; look around and do not let tunnel vision stop you from seeing them.

Because the number of available holds decreases as the route's difficulty increases, a calm attitude helps on more difficult terrain. (Arno Ilgner's book *The Rock Warrior's Way: Mental Training for Climbers* discusses the mental aspects of climbing in detail; see Resources.) Tune in to how your balance feels as you move deliberately, smoothly, and fluidly. Much of successful climbing results from a relaxed yet alert mind.

USE FOOTWORK

Footwork and balance are the foundations of rock climbing. Good footwork gives a climber good balance and requires less exertion than handwork does. Leg muscles are larger and stronger than arm muscles, and therefore they provide the most efficient use of muscle power. That is why climbers are frequently told to climb with their feet. Look for footholds that are comfortably spaced. Shorter steps take less energy than longer, higher steps, and you will stay in balance more easily. However, steps too close together take up more time per foot of upward progress.

Stand erect over your feet—this keeps your body weight centered over your feet, and the resulting down-pressure helps keep your feet on the holds. Anxious climbers tend to hug or lean into the rock, but this just tends to push their feet off the rock because the pressure is out, not down.

Try to walk up the rock from foothold to foothold, as if you were going up a ladder—use your hands merely for balance. When you raise a foot toward the next foothold, eye the hold and aim precisely for it. Once your foot is set in place, commit to the hold and leave your foot there. Adjust your balance to the new position by shifting your hips over the new hold. Continue transferring your weight through your leg down to that foot. Complete the move: stand up by using your leg muscles to push your body up.

MAINTAIN THREE POINTS OF CONTACT

When you begin to learn rock climbing, keep three body points—any combination of hands and feet—weighted on the rock at all times. This can be two hands and one foot (fig. 12-3) or one hand and two feet. Keep your balance over your feet until you release a hold to move for the next one. This is an especially useful approach when testing a hold for looseness without weighting it because it allows you to balance securely on three holds while testing the new one.

Fig. 12-3. Three-point suspension: Keep three body points weighted on rock at all times; here, the climber's hands and right foot provide a secure stance while she moves her left foot higher.

Be aware of where your center of gravity is—directly over your feet is usually the most stable stance. Moving your center of gravity over a new foot- or handhold causes your weight to shift to that new hold.

On more difficult climbs, it is not always possible to keep three body points in contact with the rock. There may be only one or two sound holds, so use your body position to maintain a delicate balance over those holds.

Regardless of the number of points you have in contact, however, the same principle of balance applies: keep your weight over your holds.

CHECK FOR LOOSE HOLDS

Loose rock can be all too common in the mountains. Many loose holds are obvious, but be alert for those that are not. Look for fracture lines and loose rocks (fig. 12-4a). Gently nudge any suspect hold, or give it a push with the heel of your hand (fig. 12-4b). A hollow-sounding rock is usually loose. Make sure your testing does not actually dislodge the rock! If loose rock cannot be avoided, move with extra care and deliberation. Sometimes a loose hand- or foothold can be used if you carefully push downward and in on it while weighting it—but be careful.

Fig. 12-4. Looking for loose holds: a, visually inspect the route for loose rocks (circled); b, if loose rock cannot be avoided, use extra caution in that area and test holds before using them.

BASIC TECHNIQUES

This section covers concepts, rather than specific types of moves, that can be used in all kinds of climbing.

DOWNWARD-PRESSURE

For the downward-pressure technique, place fingertips or the palm, side, or heel of the hand on the hold and press down (fig. 12-5). Pressing down with the thumb can be useful on very small holds. A common technique is to pull down on a hold from above and then put downward-pressure on it after you move above it. Downward-pressure may be used alone or in combination with other techniques, such as in counterforce with a lieback hold or as part of a stemming move (see "Crack Climbing" later in this chapter). With arm extended and elbow locked, climbers can balance one-handed by pressing down on a hold as they move the other hand to the next hold.

COUNTERFORCE

Counterforce plays a part in many of the climbing maneuvers described in this chapter. It is the use of pressure in opposing directions to help keep the climber in place. Specific counterforce techniques can be used in face climbing or crack climbing.

Fig. 12-5. Using left hand to exert downward-pressure.

COUNTERBALANCE

Counterbalance, or *flagging*, is the principle of distributing your body weight in a way that maintains your balance. This means selecting holds that do the best job of keeping your body in balance. But it also sometimes means putting a hand or foot in a particular location, even if no obvious hold is available, in order to provide counterbalance to the rest of your body (fig. 12-6). Your hips and shoulders also come into play as you move them to provide counterbalance. Flagging is useful because it enables climbers to extend their reach.

LONG REACHES

Several techniques can be used when the next available handhold is a long reach away or even out of reach. First, make the most of available holds. Move as high as possible on existing holds. Stand on your toes, but remember that this is strenuous and can contribute to muscle fatigue if you continue too long. Sometimes a longer reach is possible by standing on the outside edge of a climbing shoe, which tends to turn the body somewhat sideways to the rock. The longest reach possible is with the hand on the same side of your body as the foot you are standing on.

DYNAMIC MOVES

Another option for overcoming a long reach is to make quick intermediate moves, using holds that are marginal but can be used just long enough to allow the climber to scamper up to the next good hold. This leads to using a dynamic move (or *dyno*): a lunge or simply a quick move before you lose your balance. The time to grab the next higher handhold while making a dynamic move is at the "dead point": the apex of the arc of movement when your body is weightless for a fraction of a second before it begins to fall. Movement is most efficient at that point.

Make a dynamic move only after calculating and accepting the consequences of failure. If a dynamic move fails, a fall is likely. Do not make a dynamic move out of desperation. Ensure beforehand that the protection is secure and that a fall onto the protection will not result in hitting a ledge or the ground.

PLACEMENT EXCHANGES

Sometimes a climber needs to move one foot onto a small hold already occupied by the other foot or one hand onto a hold being used by the other hand. Either move can be made several different ways.

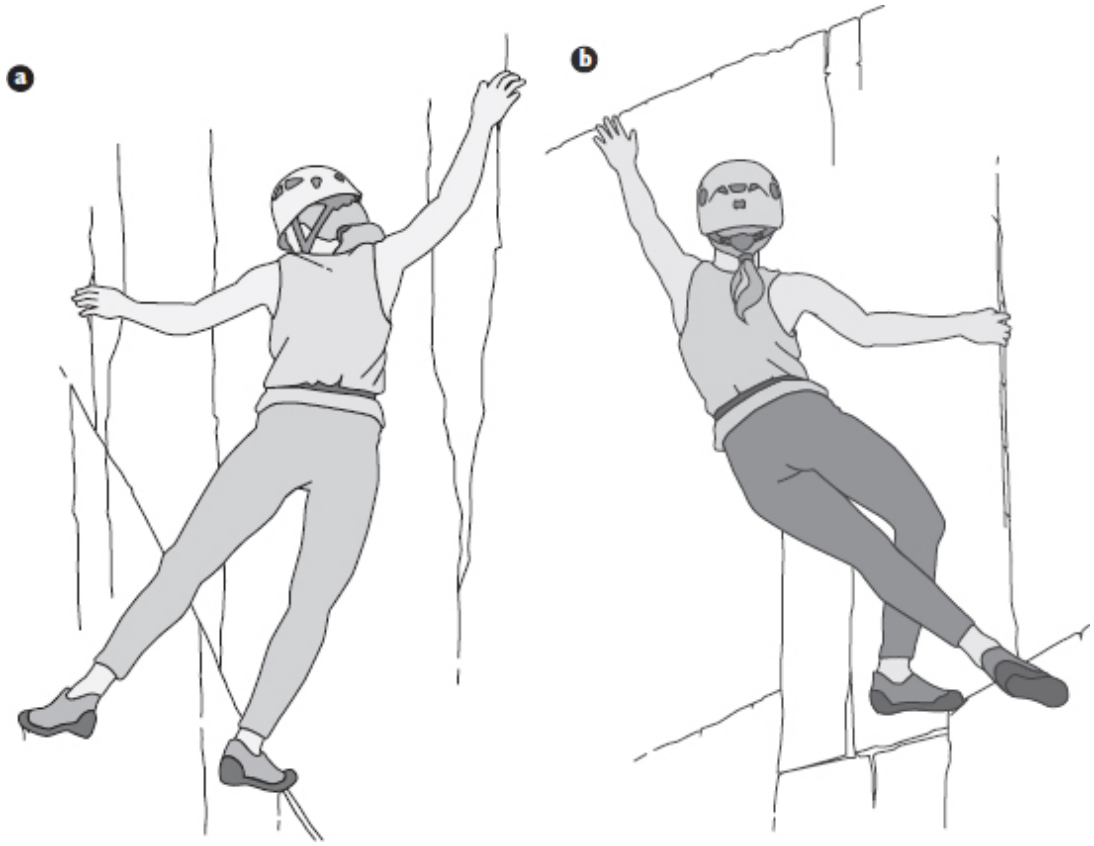

Fig. 12-6. Two examples of counterbalance, which enables an extended reach: a, the left foot is flagged to the side to provide counterbalance; b, the left foot is flagged behind the right for counterbalance.

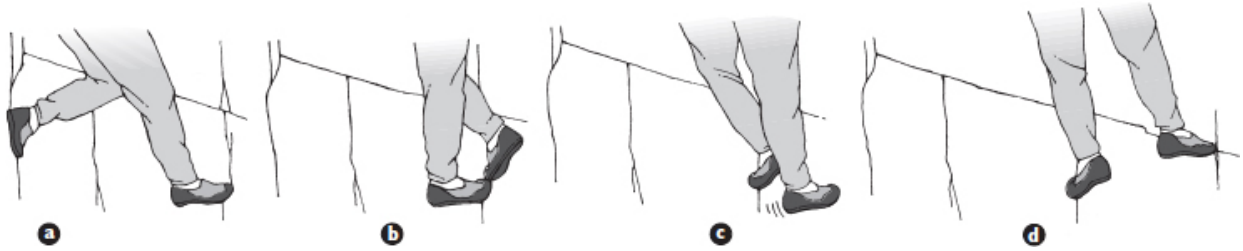

Fig. 12-7. Using a crossover to exchange foot placements on a small hold: a, right foot is on a hold; b, left foot crosses in front of the right and presses down; c, left foot presses on the hold while right foot readies for next hold; d, right foot shifts to next hold.

To exchange a foot placement, make an intermediate move using a poorer, even marginal, hold to get the one foot off the good hold long enough for the

other one to take it over. Or hop off the hold while replacing one foot with the other. Or try sharing the hold by matching feet (this is known as *matching*), moving one foot to the very edge of the hold to make enough room for the other.

The crossover is another technique: one foot crosses in front of the other (fig. 12-7a and b) to occupy a small spot on the hold while the first foot moves off that hold (fig. 12-7c) to another (fig. 12-7d).

An intermediate move can be made to trade hands, much as might be done in exchanging feet. Place both hands on the same hold, one on top of the other, or if space is limited, try picking up the fingers of one hand, one finger at a time, and replacing them with the fingers of the other hand. The crossover technique also is occasionally useful.

FACE CLIMBING

Face climbing is simply climbing by using the various features on the surface of a rock face, as contrasted with climbing the cracks that may split a face. A particular hold may be used in a variety of ways by feet and hands as the climber moves up the rock. Face climbing also includes the ascent of nearly featureless slabs, using friction and balance (fig. 12-8).

HANDHOLDS

Handholds can be used for balance, for helping climbers raise themselves by pulling up on the hold, or for providing various forms of counterpressure. Handholds that are at about head height are best because they do not demand a tiring overreach.

Fig. 12-8. Face climbing uses friction and balance when holds are minimal.

Handholds offer maximum security when all the fingers are used. Keeping fingers close together provides a stronger grip on the hold. A large hold, commonly known as a *jug*, allows the entire hand to be cupped over the hold (fig. 12-9a). A smaller open grip hold (fig. 12-9b) may allow room only for fingertips. If the hold is not large enough for all the fingers to be placed on it, “crimp”it by curling the other fingers and placing the thumb over the index finger, which permits the fingers in use to get the most force from the muscle and tendon system (fig. 12-9c); this type of hold is called a *crimp*. Be careful not to overstress fingers and cause injury by using holds that are too difficult or small for your technique or conditioning level.

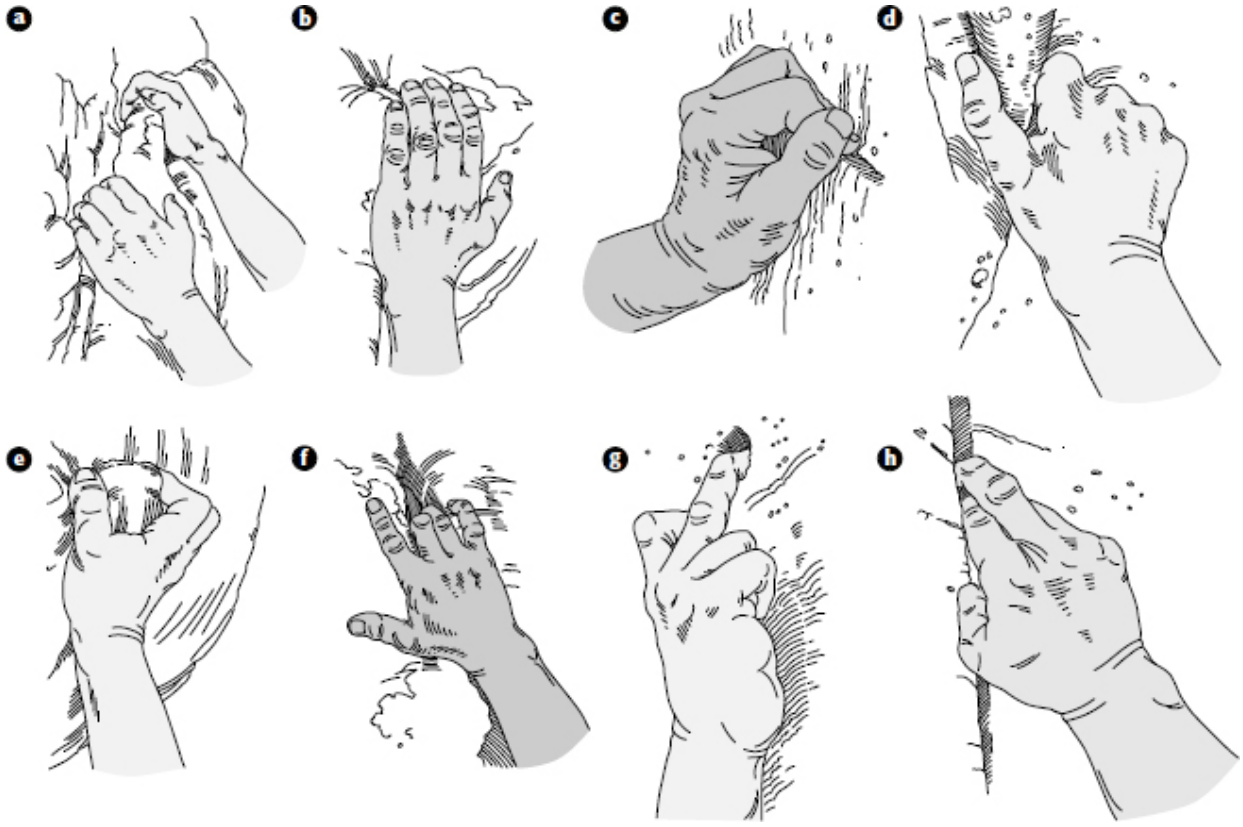

Fig. 12-9. Handholds: a, hands on a jug with fingers close together; b, smaller open grip hold; c, crimping on a smaller hold (more stressful on finger joints); d, finger pinch; e, thumb pinch; f, two-finger pocket; g, mono pocket; h, stacked fingers.

Because climbers depend mainly on their legs for upward progress, handholds are sometimes used only for balance. The finger pinch (fig. 12-9d) is a handhold that may allow climbers to maintain a balanced stance on good footholds long enough to shake out their free arm and to reach for a higher, more secure handhold or to place protection.

Smaller holds require different techniques. For example, with fingers holding onto a tiny ledge, for additional strength climbers may use the thumb in opposition on a minor wrinkle, as in a thumb pinch (fig. 12-9e), or in small holes, they may use more than one finger, as in a two-pocket (fig. 12-9f). On a narrow hold or a small pocket in the rock, climbers can use one or two fingers in a mono pocket (fig. 12-9g). On a very narrow hold, climbers can stack fingers on top of each other to increase pressure on the hold (fig. 12-9h).

Handholds that are at about head height are ideal if it is necessary to hang straight-armed for a rest (fig. 12-10), which is less tiring than hanging from bent arms. Climbers can lower their center of gravity by bending their knees

or leaning out away from the rock. When it is possible, hang an arm down and shake it out for a brief recovery before climbing again.

Some other types of handholds include slopers and side pulls. *Slopers* require an open hand and skin friction, and the holds, true to their name, slope downward. A *side pull* is a vertically oriented hold off to one side. Lean away from it as you pull on it.

Other techniques can also be useful on friction slabs. Face holds and cracks may be intermittently available for hands or feet. On small edges or irregularities, use down-pressure (see above) with fingertips, thumb, or heel of the hand. A lieback (see later in this chapter) with one hand might be possible using tiny edges. Look for an opportunity for stemming (see later in this chapter), which could mean a chance to rest.

Fig. 12-10. "Resting" an outstretched arm while hanging on a straight arm.

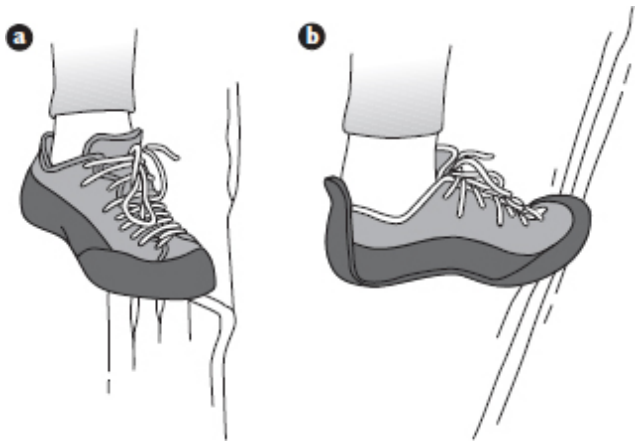

Fig. 12-11. Footholds: a, edging; b, smearing.

FOOTHOLDS

Climbers use most footholds by employing one of two techniques: edging and smearing. On many holds, either technique will work, and the one to use depends on personal preference and the stiffness of the climber's footwear. A third technique, foot jamming, is covered in "Crack Climbing" later in this chapter.

When *edging*, the climber weights the edge of the shoe sole over the hold (fig. 12-11a). Climbers use either the inside or outside edge, but they usually prefer the inside for greater ease and security. The ideal point of contact may vary, but generally it is between the ball of the foot and the end of the big toe. Keeping the heel higher than the toes provides greater precision but is more tiring. Using the toe of a boot or rock shoe on a hold (*toeing in*) is also very tiring. With practice, climbers become proficient using progressively smaller footholds.

In *smearing*, the foot points uphill, with the sole of the shoe "smeared" over the hold (fig. 12-11b). Smearing works best with rock shoes or flexible boots. On lower-angle rock, climbers may not need to use an actual hold but only to achieve enough friction between sole and rock. On steeper terrain, smearing the front of the foot over a hold allows even tiny irregularities in the rock to provide significant friction and security. Slab or friction climbing requires liberal use of smearing (also called *frictioning*) moves. Balance and footwork are the keys to success, and the primary technique is smearing with the feet. In using footholds, make the best use of the direction of force on the hold. Flexing the ankle may increase the surface area of contact between sole

and rock, giving maximum holding power. Leaning away from the rock creates inward as well as downward force on the hold, increasing security.

When using large footholds, called *buckets*, place only as much of the foot as necessary on the hold (fig. 12-12a). Putting a foot too far into the bucket can sometimes force the lower leg outward, making for an out-of-balance stance (fig. 12-12b).

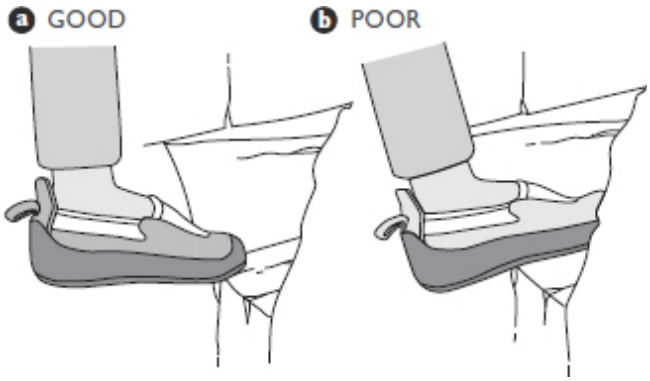

Fig. 12-12. Bucket hold: a, use only as much of the hold as is needed (good); b, a foot too far into a bucket can force lower leg outward (poor).

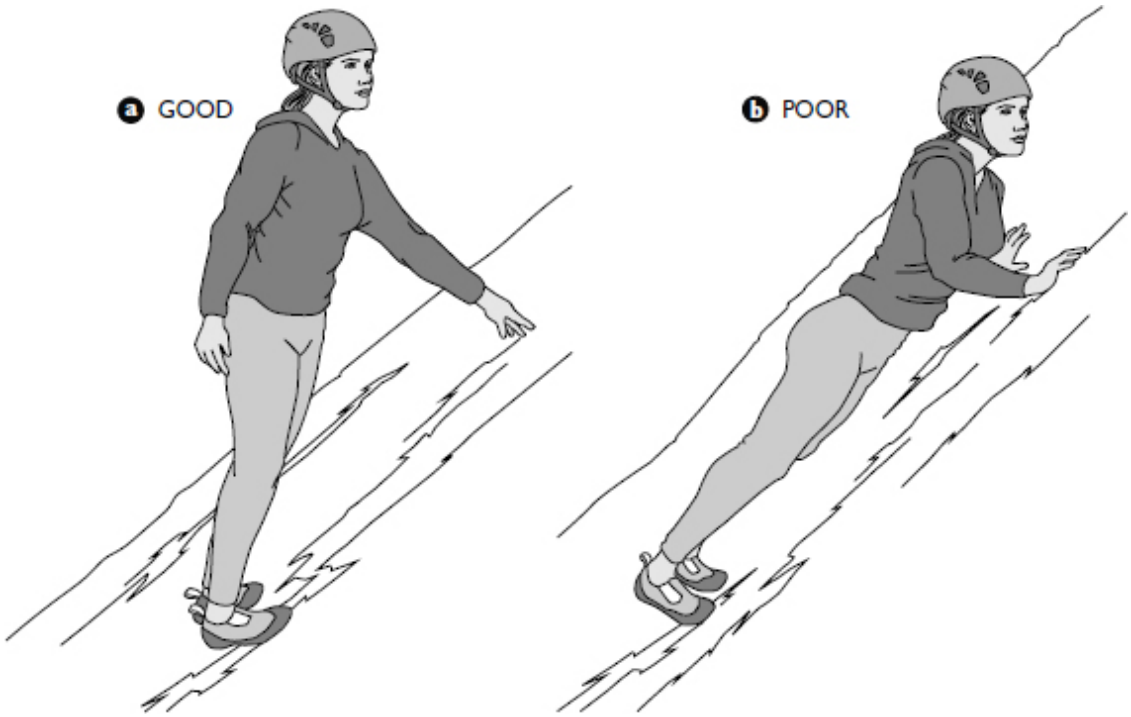

Fig. 12-13. Slab (friction) climbing: a, keep weight over feet and push hips away from rock (good); b, avoid leaning into the slope, which causes feet to slide (poor).

Avoid placing knees on a hold, because knees are susceptible to injury and offer little stability. Nevertheless, even experienced climbers may on rare occasions use a knee hold to avoid an especially high or awkward step. The main considerations are to avoid injury from pebbles and sharp crystals and to avoid becoming trapped on your knees, unable to rise beneath a bulge or roof.

Fatigue, often aggravated by anxiety, can lead to troublesome spastic contractions of the leg muscles, jocularly known among climbers as "sewing-machine" or "Elvis" leg. The best way to stop it is to relax your mind, remember to breathe, and change your leg position somehow, by moving on to the next hold, lowering your heel, or straightening your leg.

When smearing, remember to flex the ankle (lowering the heel) and to keep weight directly over the ball of the foot for maximum friction between rock and sole (fig. 12-13a). Avoid leaning into the slope with your body, which causes the feet to slide down and out from under you (fig. 12-13b). Instead, keep your weight over the feet, bending at the waist to allow the hands to touch the rock and pushing the hips and buttocks away.

Take short steps to maintain balance with your weight over your feet. Look for the small edges, rough spots, or changes in angle that provide the best foot placements. Sometimes climbers actually have to feel with their hands or feet to find the irregularities.

MANTEL

The mantel is a specific use of the down-pressure technique. It lets climbers use hand down-pressure to get their feet up onto the same hold that their hands are using when no useful handholds are available higher.

The classic mantel is easiest if the ledge is at about chest height (fig. 12-14a). As you grip the ledge, walk your feet up the rock (fig. 12-14b) until you can place both hands flat on the ledge, palms down, with the fingers of each hand pointing toward the other hand. Then raise your body up onto stiffened arms (fig. 12-14c). Continue to walk your feet up the rock or, if you can, spring up from a good foothold, lifting one foot up onto the ledge (fig. 12-14d), and stand up, reaching for the next handholds for balance (fig. 12-14e).

This basic mantel, however, is not always possible, because a ledge is often higher, smaller, or steeper than a climber might wish. If the ledge is narrow, it may be possible to use the heel of the hand, with the fingers pointed down. If the ledge is over your head, pull down on it first and then use

downward-pressure as you move upward. If the ledge is not big enough for both hands, mantel on just one arm while the other hand makes use of any available hold or perhaps just balances against the rock. Do not forget to leave room for your foot.

Avoid using knees on a mantel because it may be difficult to get off them and back on your feet, especially if the rock above is steep or overhanging. Sometimes in midmantel it is possible to reach up to a handhold to help as you begin standing up.

COUNTERFORCE IN FACE CLIMBING

Counterforce can be used to pull in on widely spaced holds—a pulling-together action (fig. 12-15a)—or to press in on both sides of a sharp ridge (fig. 12-15b) to create inward pressure. The hands can also be used in counterforce to the feet, as in the undercling (see below).

Stemming on a Face

Stemming is a valuable counterforce technique that lets climbers support themselves between two spots on the rock that might be of little or no use alone. It often provides a method of climbing steep rock where no holds are apparent, simply by pressing in opposing directions with the feet or with a hand and a foot.

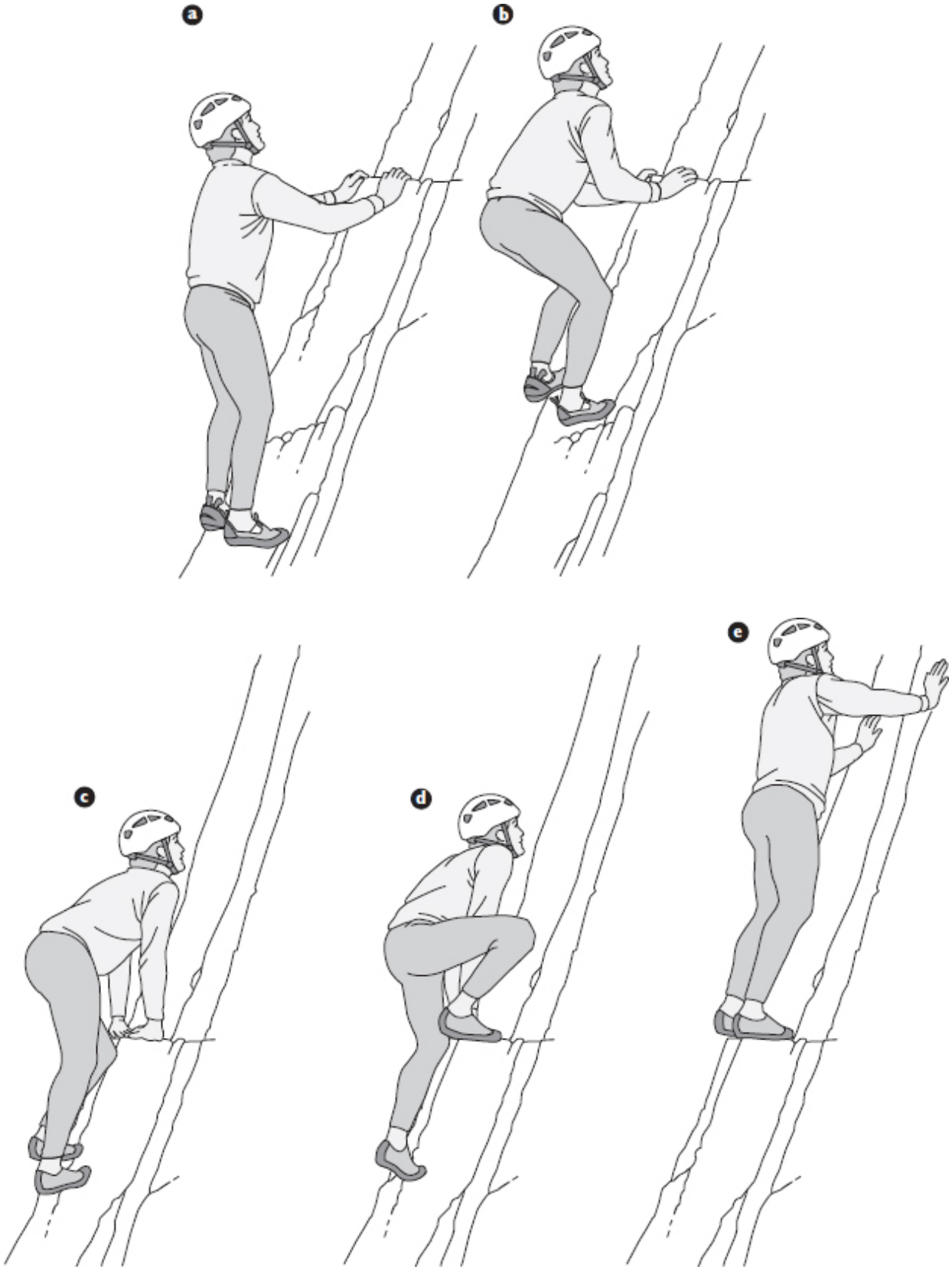
a
b
c
d
e

Fig. 12-14. Mantel: (facing page) a, with a ledge at about chest height; b, walk feet up; (above) c, place both hands flat on ledge, palms down and fingers of each hand pointing toward the other hand; d, place one foot on the ledge; e, stand up and reach for the next handholds.

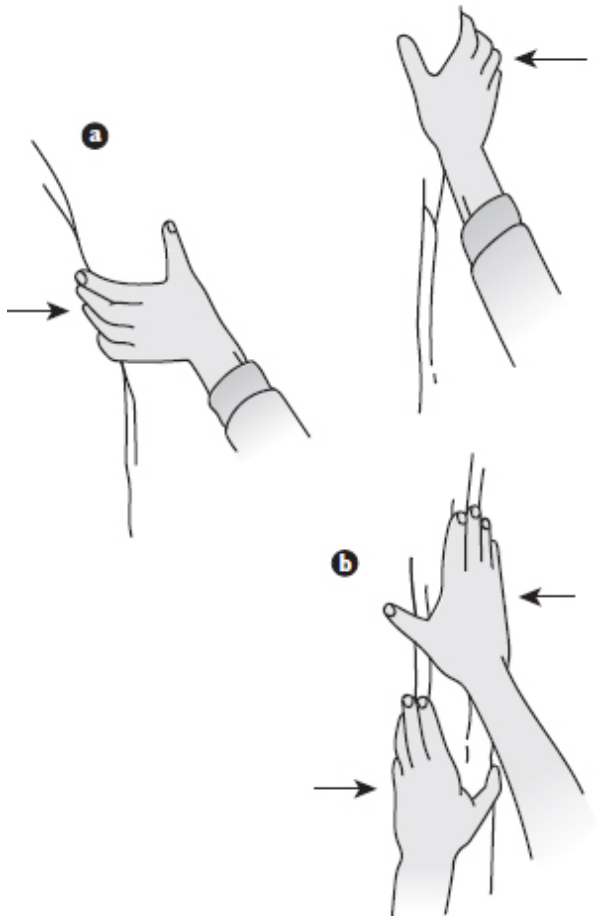

Fig. 12-15. Counterforce: a, inward pressure, pulling together; b, inward pressure, pressing in on a sharp ridge.

Stemming may open an avenue of ascent on a steep face, where climbers can press one foot against a slight protrusion while the other foot or a hand gives opposing pressure against another wrinkle (also known as a "rugosity") in the rock (fig. 12-16).

Undercling

To undercling, your hands (palms up) pull outward beneath a flake or lip of rock while your body leans out and your feet push against rock (fig. 12-17). Your arms pull while your feet push, creating a counterforce. Try to keep your arms extended. Both hands can undercling at the same time, or one hand can undercling while the other uses a different type of hold.

An undercling hold may have multiple uses. For example, from below a rock flake, climbers can hold its bottom edge in a finger pinch or thumb pinch and then convert to an undercling as they move up to the flake.

Fig. 12-16. Stemming on a steep face.

Fig. 12-17. Undercling: arrows show direction of pressure—hands pull out, feet push in.

CRACK CLIMBING

Many climbing routes follow the natural lines of cracks in the rock. Cracks have the advantage of offering handholds and footholds virtually anywhere along their length, as well as protection opportunities (see Chapter 13, Rock Protection). Some climbers seem to find crack-climbing technique more difficult to develop than face-climbing technique. Perhaps this is because even easy crack climbs demand a higher proportion of technique to strength than do face climbs. Crack climbing is also very individualized, based on the size of each climber's hands and fingers. A crack climb that is easy for one climber may be more difficult for others with smaller hands, for example, or vice versa. Because of the individualized nature of crack climbing, experiment with what works for you; as with face climbing, balance and continued practice are the keys to success. That said, the following crack-climbing techniques are essential tools.

JAMMING

Jamming is the basic technique of crack climbing. To jam, place a hand or foot into a crack, then turn the foot or flex the hand so that it is snugly in

contact with both sides of the crack. This wedging must be secure enough that the hand or foot will not come out when weighted. Look for constrictions in the crack, and place hand and foot jams just above these constrictions. When learning to crack climb, it is a good idea to try weighting jams as a test—while remaining balanced on the other points of contact—before actually trying to move up on the jams.

Cracks may be climbed with a pure jamming technique, with both feet and hands using jams, or in combination with other types of holds. While moving up on a jam, maintain the jammed position by using down-pressure (see above). Of course, there is nothing to stop a climber from also using any nearby face holds (fig. 12-18).

The following technique descriptions are basic guidelines that may be adapted to the varying size and configuration of the particular crack a climber is on. With practice, climbers become more adept at selecting the appropriate technique to apply in a given situation.

Hand-Sized Cracks

The easiest crack to master is the hand-sized crack. As the name implies, climbers insert their entire hand into the crack—relax the hand when you insert it, and then expand it so that it becomes wedged in the crack. Different ways to increase hand width include flexing the thumb toward the palm so that the lower "meaty" part of the hand firmly contacts the walls of the crack, as well as cupping the hand for full contact (fig. 12-19a). To increase pressure against the walls, climbers sometimes tuck their thumb below their fingers and across the palm, especially in wider cracks (fig. 12-19b). The hold can often be improved by bending the wrist so the hand points into the crack rather than straight up and down.

Fig. 12-18. Combining jamming with face climbing.

The hand jam is done either thumb up or thumb down. The thumb-up technique often is easiest and most comfortable for a vertical crack (see Figure 12-19a and b; see also bottom hand in Figure 12-19d), and it allows climbers to reach higher in vertical cracks. The thumb-up configuration is most secure when the climber's body leans to the same side as the hand that is jammed.

The thumb-down technique (fig. 12-19c; see also top hand in Figure 12-19d) may allow for a more secure jam when the thumbs-up technique feels insecure. However, it is not possible to reach as high with this jam in a vertical crack, resulting in more hand jams and more energy expended. Because the hand can be twisted for better adhesion, climbers can lean in any direction off this jam.

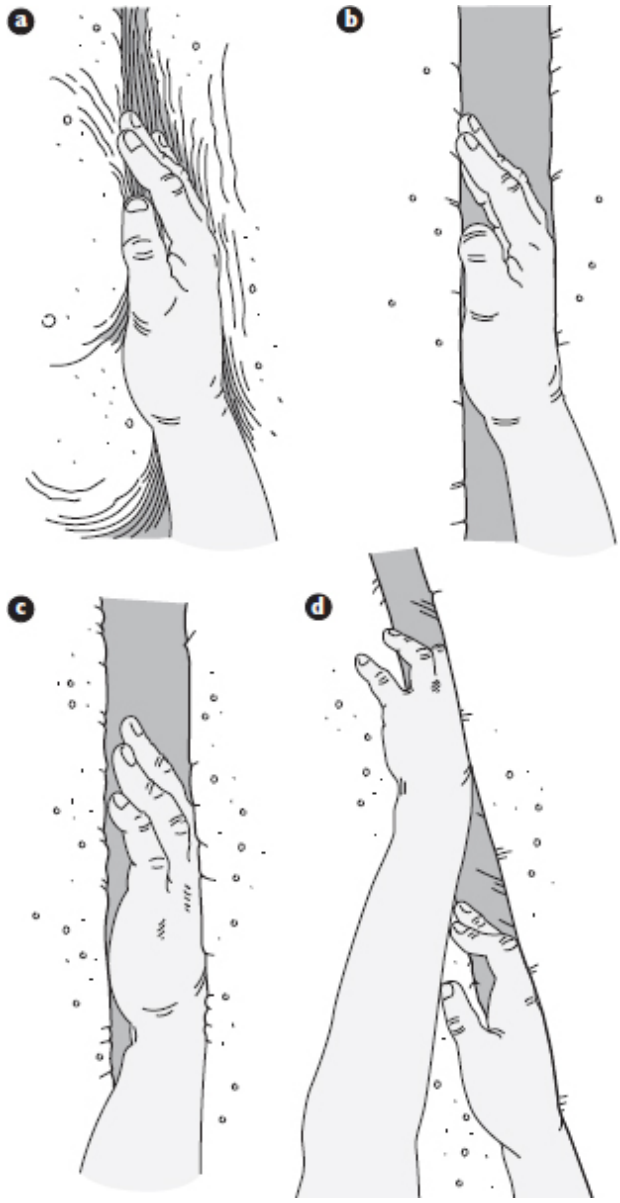

Fig. 12-19. Hand jams: a, thumb-up jam; b, with thumb tucked across palm; c, thumb-down jam; d, combining thumb-down and thumb-up jams in a diagonal crack.

Climbers use a combination of thumbs up and thumbs down, especially in diagonal cracks, where it is often useful to jam the upper hand thumb down and the lower hand thumb up (fig. 12-19d).

With hand jams, climbers must keep alert to the effect of their elbow and body position on the security of the hold. As they move up, they may have to rotate their shoulder or trunk to keep sufficient torque and downward pressure to maintain the jam. Direction of force should be pulling down, not out of the crack. In general, keep the forearm parallel to the crack while climbing.

In dealing with hand jams, climbers encounter variants at both ends of the size scale: thinner cracks that will not admit an entire hand but are larger than finger cracks, up to wider cracks that are not quite large enough for a fist jam but require extra hand twisting to create enough expansion for a secure hand jam. The size of a climber's hand is a major factor in determining the appropriate technique and the degree of difficulty of any particular crack.

Hand-sized cracks are good for foot jamming too, and it is generally possible to wedge a shoe in as far as the ball of the foot. Insert a foot sideways (fig. 12-20a), with the sole facing the side of the crack (big toe facing up), and then twist it sole-down to jam (fig. 12-20b). Avoid twisting the foot so securely that it gets stuck.

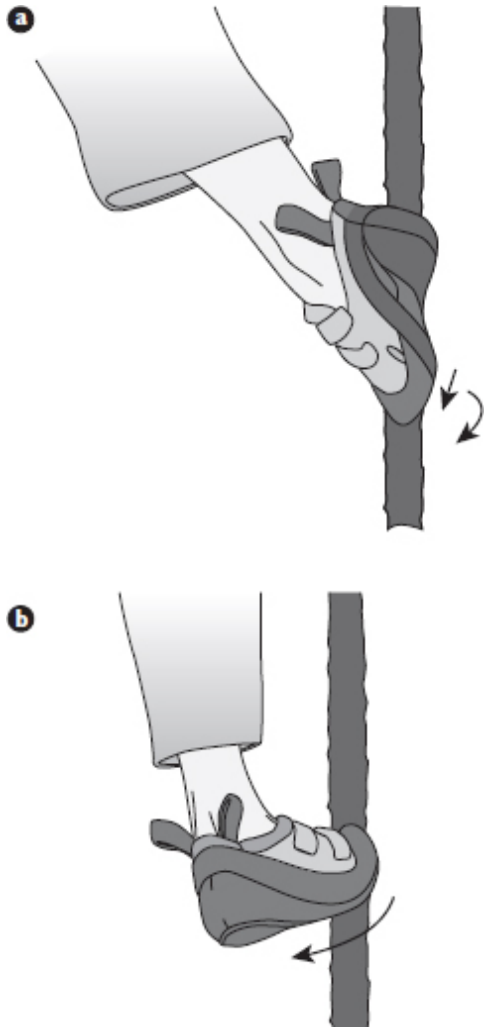

Fig. 12-20. Foot jams: a, with foot facing sideways, stick toe in crack; b, then twist foot sole-down to jam.

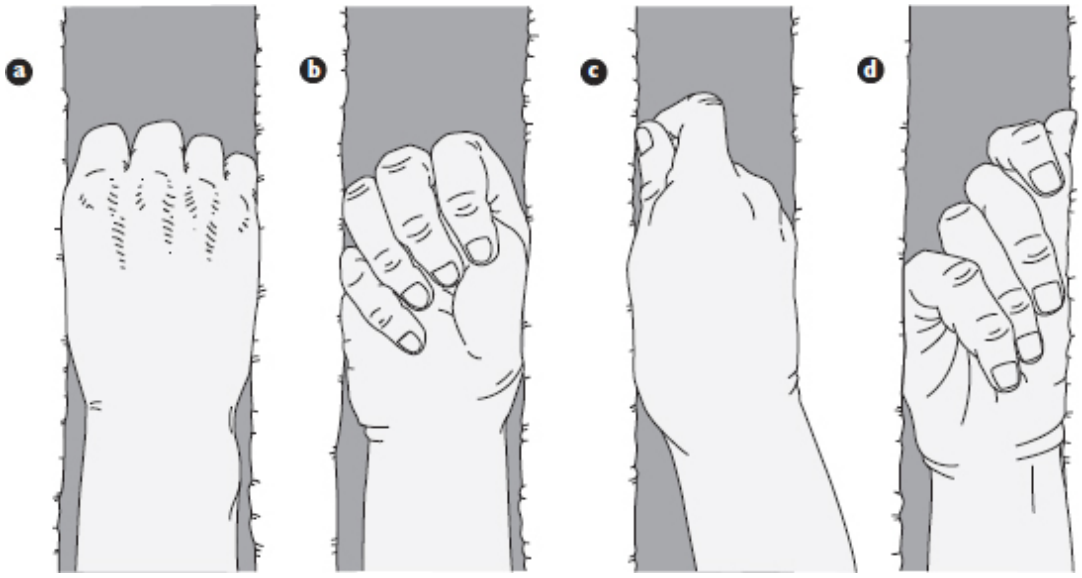

Fig. 12-21. Fist jams: a, palm facing in; b, palm facing out; c, oblique facing in; d, oblique facing out.

Fist-Sized Cracks

In a crack that is too wide for a hand jam, climbers can insert a fist. The thumb may be inside or outside the fist, depending on which provides the best fit. The palm may face either the back of the crack (fig. 12-21a) or the front (fig. 12-21b); if a full fist jam cannot be done, try turning the hand slightly to the side to do an oblique fist jam (fig. 12-21c and d). Flexing the muscles in the fist can expand it slightly to help fit the crack. Fist jams are often painful, but they can be very useful. For the most secure hold, try to find a constriction in the crack and jam the fist above it. If the crack is too wide for a hand but too small for a fist, it is often possible to shove an entire forearm into the crack and flex it for purchase.

Fist-sized cracks can generally accept an entire foot. As with hand-sized cracks, insert a foot sideways, sole facing the side of the crack, and rotate the foot to jam it securely in place. In even wider cracks, it is possible to jam a foot diagonally or heel to toe (fig. 12-22).

Finger-Sized Cracks

Finger jams make it possible to climb some of the narrowest cracks, where a climber may be able to insert only one or more fingers or perhaps just the fingertips. Finger jams are commonly done with the thumb down. Slip the fingers into the crack and twist the hand to lock the fingers in place (fig. 12-

23a). Climbers get added strength by stacking fingers and also by pressing their thumb against their index finger in a ring jam (fig. 12-23b and c).

Fig. 12-22. Heel-toe foot jam.

In slightly wider cracks, try a thumb lock, also called a *thumb cam* (fig. 12-23d). Place an upward-pointing thumb in the crack, the thumb pad against one side of the crack and a knuckle against the other. Slide the tip of the index finger tightly down over the first joint of the thumb to create the lock.

The pinkie jam is done with a thumb up (fig. 12-23e and f). Put the little finger in a crack and stack the other fingers on top—fingertips down, nails up. In slightly larger cracks, it may be possible to wedge the heel of a hand and its smaller fingers into a crack that is not quite wide enough for a full hand jam. The weight here is borne by the heel of the hand.

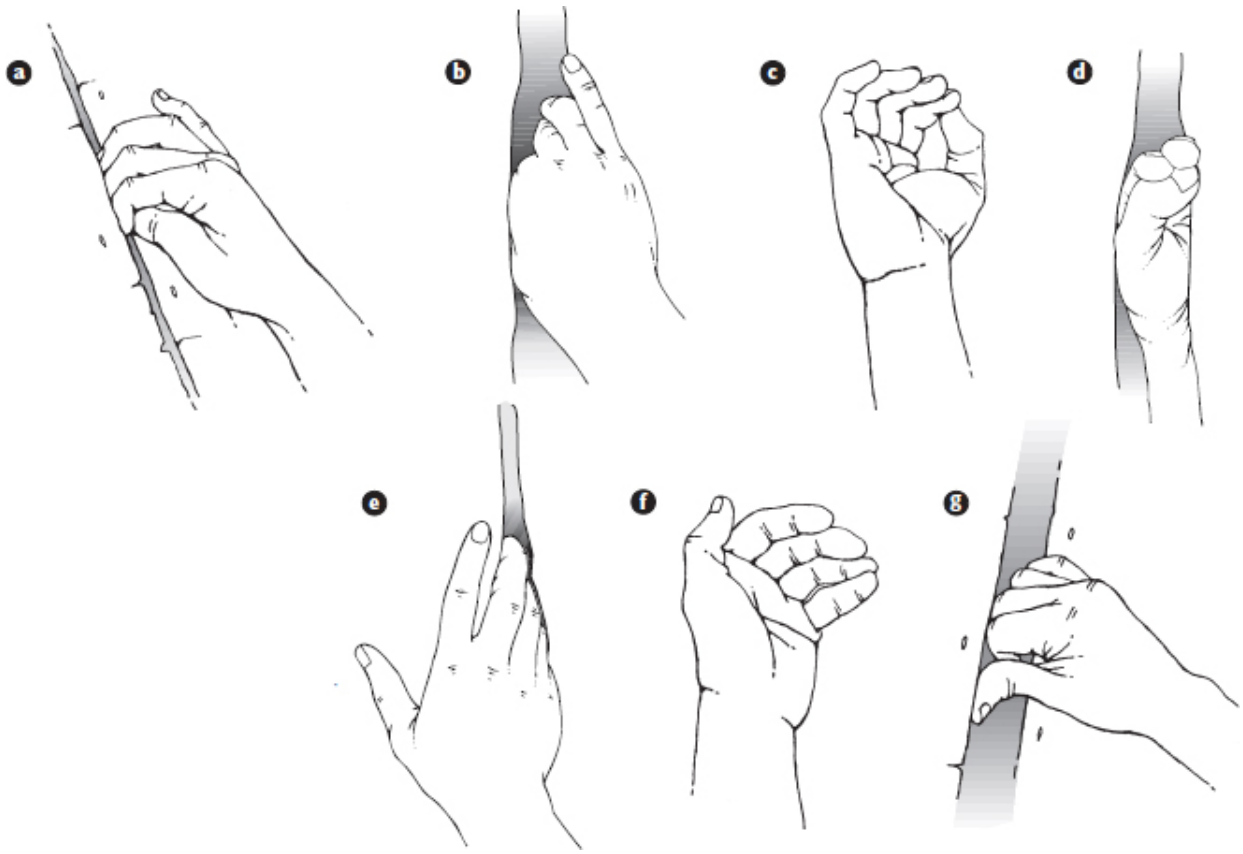

Fig. 12-23. Finger jams:
a, thumb-down jam; b, ring jam; c, hand configuration for a ring jam; d, thumb cam; e, pinkie jam; f, hand configuration for a pinkie jam; g, counterpressure with thumb.

For another variation done with thumb down, use the counterpressure of a thumb pushing against one side of the crack and the fingers pushing against the other (fig. 12-23g).

Finger-sized cracks are not big enough to accept a climber's foot, but there is often room for toes. Wedge toes into a crack by turning the foot sideways—usually with the inside of the ankle up—and inserting toes in the crack (see Figure 12-20a), then twist the foot to jam it (fig. 12-24a). Climbers also wedge their toes into a steep inside corner with a smearing technique, keeping their heel lower than their toes and putting pressure down and in to keep their toes in place (fig. 12-24b). Using smearing and friction for the feet also works well when climbing a finger-sized crack.

COUNTERFORCE IN CRACK CLIMBING

Counterforce can be used in a vertical crack by placing both hands in the crack and pulling in opposite directions on the sides of the crack—a pulling-

apart action (fig. 12-25)—to create outward pressure. Two other types of counterforce are described below.

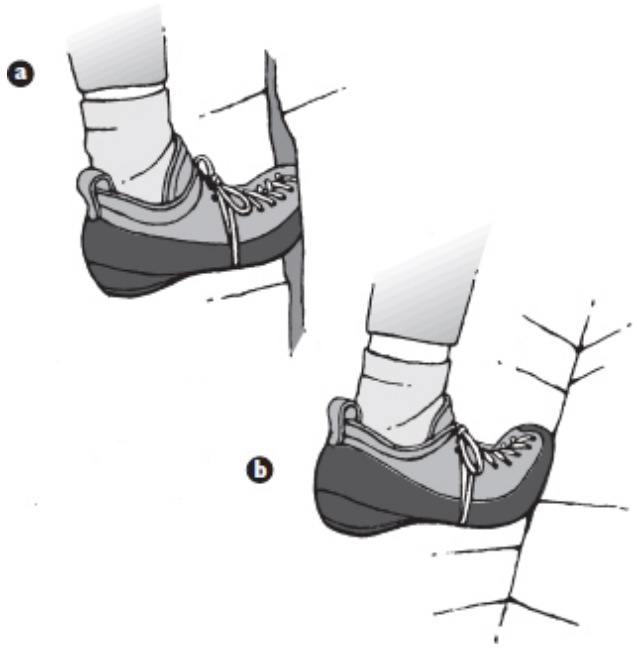

Fig. 12-24. Toe jams: a, jamming in a crack; b, smearing in a corner.

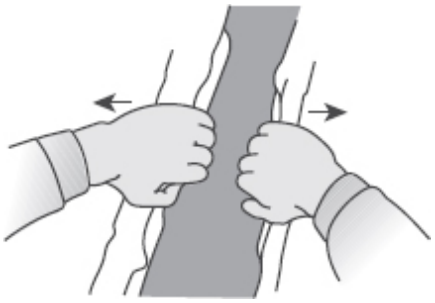

Fig. 12-25. Counterforce in a vertical crack: outward pressure.

Classic Stemming

The classic use of stemming is in climbing a rock chimney. It also comes into play in climbing a dihedral (also called an *open book*), where two walls meet in an approximately right-angled inside corner. One foot presses against one wall of the chimney or dihedral, while the other foot or an opposing hand pushes against the other wall (fig. 12-26).

Liebacking

The classic lieback technique, another form of counterforce, uses hands pulling and feet pushing in opposition as the climber moves upward in shuffling movements (fig. 12-27a). It is used to climb a crack in a corner, a crack with one edge offset beyond the other, or along the edge of a flake. Grasp one edge of the crack with both hands and lean back and to the side, away from the crack, on straightened arms. At the same time, push your feet against the opposite wall of the crack. Keep your arms extended to minimize muscle stress. Keep your feet high enough to maintain friction on the rock, but not so high that it is too strenuous. As always, feel for your body's balance and adjust accordingly. This is a strenuous technique, and it is difficult to place protection when liebacking.

Fig. 12-26. Stemming across a chimney.

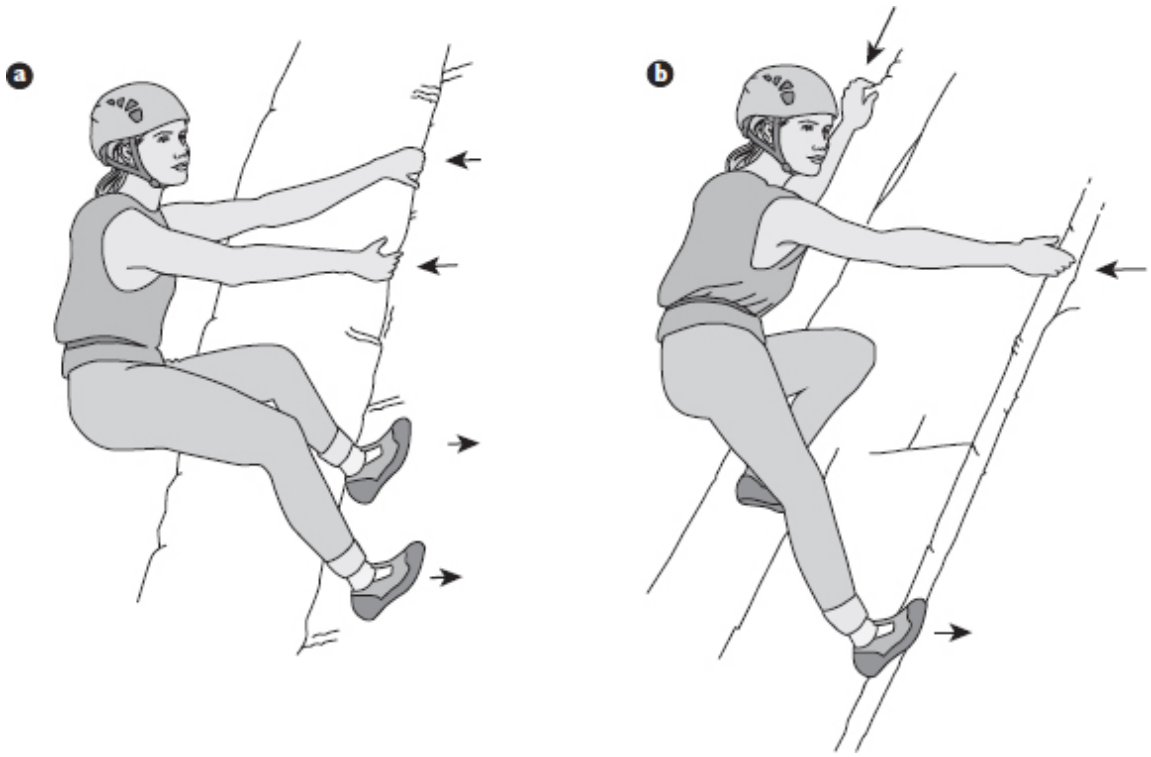

Fig. 12-27. Lieback: a, classic lieback; b, combining a lieback (right hand and foot) with face holds (left hand and foot). Arrows show direction of pressure.

The lieback can be used along with other holds as the rock allows. Climbers can lieback on a single handhold in combination with other holds or use one hand and foot in a lieback while using face holds for the opposite hand and foot (fig. 12-27b).

When using the lieback technique, a climber's body may have a tendency to swing sideways out of balance toward the crack, in what is known as the "barn-door" effect, which usually results in a fall. To avoid the barn-door effect, do not apply too much pressure with the leg closest to the rock.

CHIMNEYS

A chimney is any crack big enough to climb inside, ranging in size from those that will barely admit a climber's body (called *squeeze chimneys*) to those that a climber's body can barely span.

The basic principle is to span the chimney with the body, using counterforce to keep from falling. Depending on the width of the crack, either face one side of the chimney or face directly into or out of the chimney. The best body position and technique to use depend on the situation, the climber's size, and whether the climber is wearing a pack. Which direction to face may

depend on what holds are available outside the chimney and what the best way will be to climb out of it.

In squeeze chimneys, wedge the body in whatever way works best (fig. 12-28a) and squirm upward (fig. 12-28b). Look for handholds on the outside edge or inside the chimney. Arm bars and chicken wings (see "Off-Width Cracks" below) may be useful. It is helpful, sometimes, to press a foot and knee of one or both legs, for example, against opposite sides of the chimney (fig. 12-28c and d). Try stacking both feet in a T configuration, with one foot placed parallel to one side of the rock and the other placed perpendicular to it, jammed between the first foot and the opposite wall (fig. 12-28e). Climbing squeeze chimneys can be very strenuous.

A crack that is somewhat wider than a squeeze chimney offers more room to maneuver. Press the back and feet against one side of the chimney as the knees and hands push against the other side (fig. 12-29a). Move upward by squirming. Or try a sequence of wedging the upper body while raising feet and knees and then wedging them and raising the upper body.

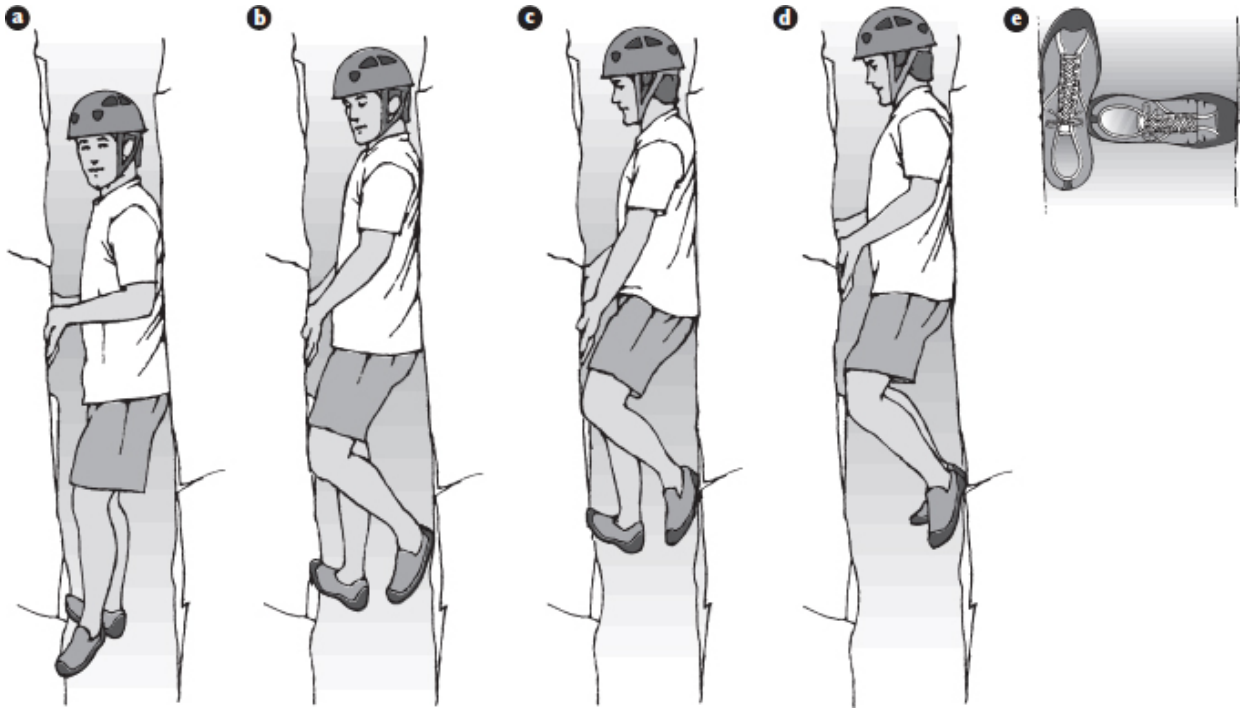

Fig. 12-28. Chimney technique in a squeeze chimney: a, wedge whole body into chimney; b, press foot and knee against opposite sides; c, squirm up; d, begin another sequence; e, stacking feet.

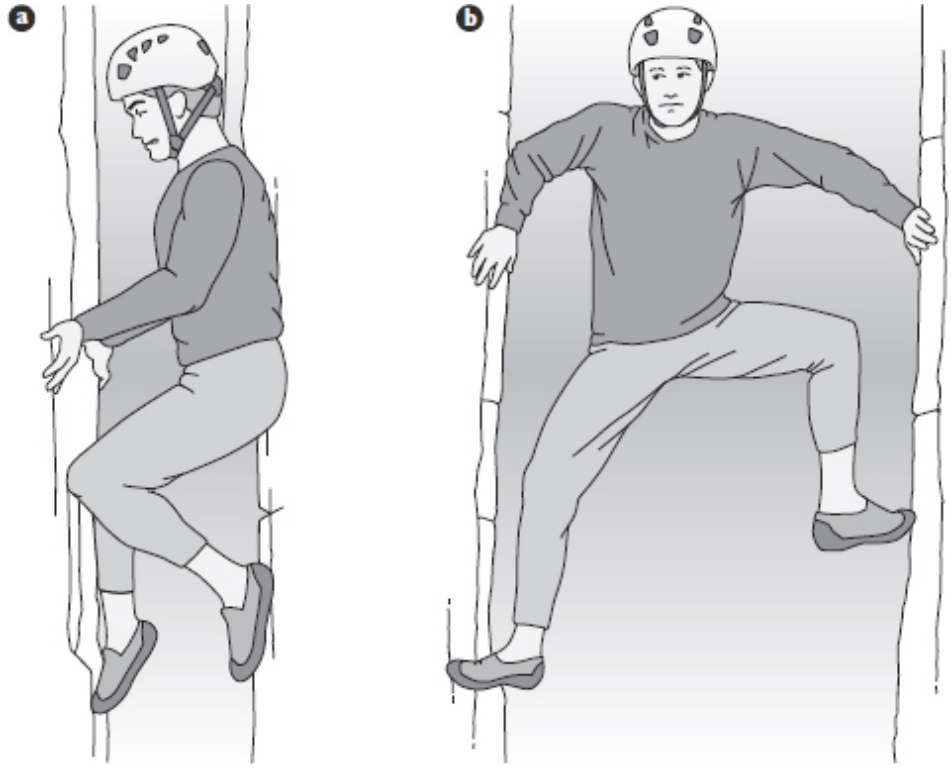

Fig. 12-29. Chimney techniques: a, in a narrow chimney; b, in a wide chimney.

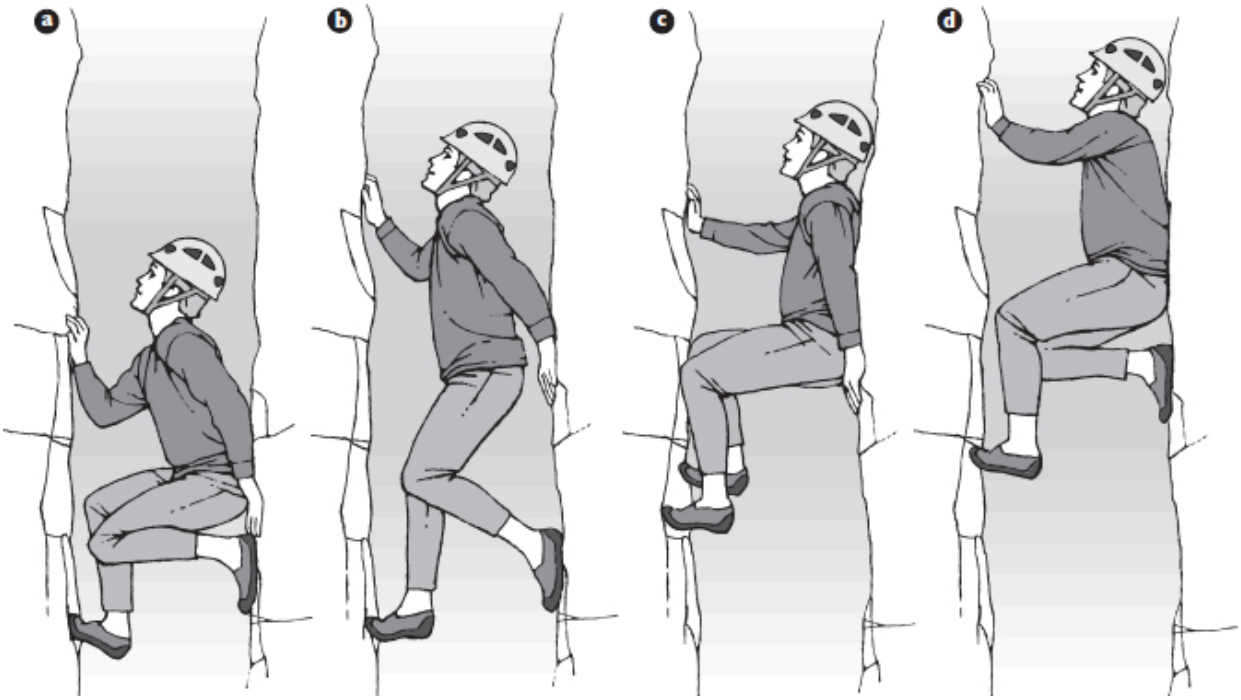

Fig. 12-30. Chimney techniques in a moderate-width chimney: a, using counterforce between hands and between feet; b, moving up; c, using counterforce between buttocks and feet; d, beginning the sequence again.

A wide chimney calls for stemming technique, in which a climber faces directly into or out of the chimney (fig. 12-29b). Counterforce is applied between the right hand and foot on one side of the chimney and the left hand and foot on the other side. Press down as well as against the sides, especially if there are holds on the sides of the chimney. Ascend either by alternately moving arms and legs or by moving each leg and then each arm.

A moderate-width chimney is perhaps 3 feet (1 meter) wide. To climb a moderate-width chimney, start by facing one wall of the chimney with your back toward the other one wall. Press one foot against each wall and one hand against each wall (fig. 12-30a). Move upward by straightening your legs and then reestablishing hand positions (fig. 12-30b). Immediately bring your back-wall leg across to the same side as the forward leg (fig. 12-30c). Then swing your forward leg across to the back-wall position (fig. 12-30d). Now move upward again by straightening your legs. Alternatively, your hands may push against one wall in counterforce to your back pressed against the other, or your feet may push against one wall in counterforce to your buttocks against the other (see Figure 12-30c).

Beware of getting too far inside a chimney: though it may feel more secure psychologically, it can leave you lodged deep inside and make it difficult to move back out. There is a better chance of finding useful handholds and footholds near the outside of the chimney. Climbing deep inside the chimney also can make it harder to exit at the top. The transition from the top of the chimney to other types of climbing is often a challenge that may require extra thought and creativity.

Chimney technique may be useful in places that do not look like classic chimneys. It can be used to climb dihedrals (fig. 12-31) or short, wide sections of otherwise narrower cracks. Knee pads can be very useful when climbing routes with extensive chimney sections.

OFF-WIDTH CRACKS

Climbers have figured out ways to jam their arms, shoulders, hips, knees, and just about anything else into the difficult and awkward features known as off-width cracks. They are “off-width” because they are too wide for hand or fist jams but too narrow to admit the entire body for chimneying.

The basic off-width technique calls for standing sideways to the crack and inserting one full side of the body into it (fig. 12-32). When confronted with an off-width crack, first decide which side of the body to put inside the crack.

This depends on several things, such as holds in the crack or on the face, the direction in which the crack leans, and whether it flares larger in places.

Fig. 12-31. Chimney technique in a dihedral.

Fig. 12-32. Climbing an off-width crack: countepressure between hip or knee and foot, plus heel-toe jams.

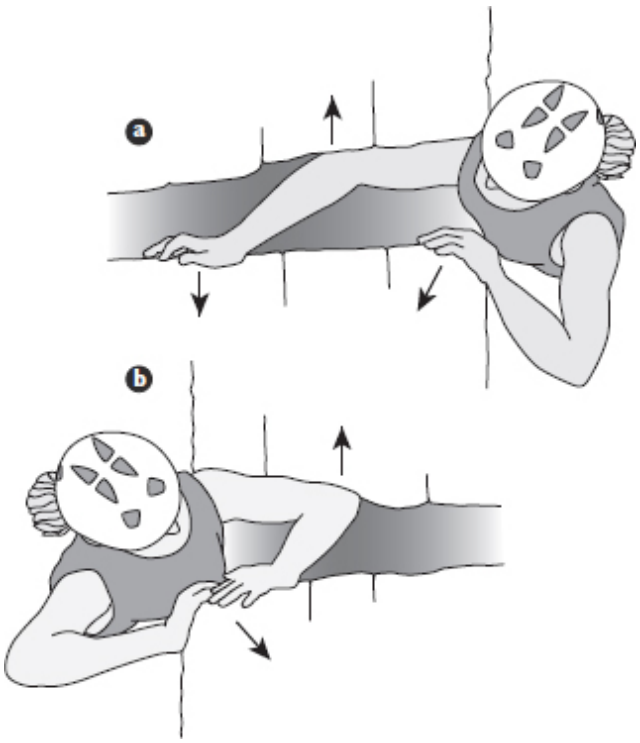

Fig. 12-33. Off-width climbing techniques: a, arm bar; b, chicken wing.

After settling on which side to use, put the inside leg inside the crack to form a leg bar, usually with counterpressure between foot and knee or foot and hip. This foot is often placed in a heel-toe jam (see Figure 12-22). The outside foot also is inside the crack in a heel-toe jam. Try to keep heels above toes (for better friction) and turned into the crack (to allow the outside knee to turn out).

A primary body-jam technique is the arm bar. With your body sideways to the crack, insert one arm fully into the crack, with the elbow and the back of the upper arm on one side of the crack giving counterpressure to the heel of the hand on the other side (fig. 12-33a). Get the shoulder in as far as possible, and have the arm bar extend diagonally down from the shoulder.

For chicken-winging, a variation of the arm bar, fold an arm back at the elbow before inserting it in the crack, and press the palm against the opposite side in counterforce to the shoulder (fig. 12-33b).

In either the arm bar or the chicken wing, use the outside arm to provide down-pressure to help hold you in the crack, or bring it across the front of your chest and push it against the opposite side of the crack, elbow out.

You are now wedged securely in the crack. To climb, move the outside leg upward to establish a higher heel-toe jam. When this jam is set, stand up on it.

Then reestablish the inside leg bar and arm bar (or chicken wing), and reposition the outside arm. This again wedges your body in the crack. You are now ready to move the outside leg upward again to establish a yet higher heel-toe jam. Continue repeating this procedure.

Climbers may use their outside foot occasionally on face holds, but watch out for the tendency for these outside footholds to pull you out of the crack.

For especially awkward crack sizes, climbers may have to stack hand jams (the "butterfly technique") or fist jams in the crack, or jam with the knee. A specialized technique, Leavittation (named after Yosemite climber Randy Leavitt), is used to climb an overhanging off-width.

Many alpine climbs have short sections of off-width cracks, but some climbs with long, strenuous off-widths have a cultlike following. For these, specialized rock protection (such as Big Bros; see Chapter 13, Rock Protection) and extra clothing and padding to protect the skin are a must. Online resources go into detail about specialized crack climbing (see Resources).

COMBINING CRACK- AND FACE-CLIMBING TECHNIQUES

Cracks also may be climbed with a pure lieback technique (see Figure 12-27a), by liebacking with one hand and foot (see Figure 12-27b), or by liebacking with one arm in combination with face holds for the other hand (fig. 12-34). This may result in a kind of stemming action.

Dihedrals may be climbed by using various combinations, such as hands jammed in a crack splitting the dihedral, combined with feet stemming on opposite sides of the dihedral (fig. 12-35).

Climbers may find useful edges or other holds hidden within cracks—on the sides or even at the back of wide cracks. It is also possible to pull down on a horizontal crack like a regular hold or ledge.

OTHER CLIMBING TECHNIQUES

Features such as overhangs, roofs, horizontal or diagonal sequences, and ledges challenge climbers to employ a variety of techniques, tactics, and body positions.

NEGOTIATING OVERHANGS AND ROOFS

To climb overhangs and roofs, remember the main points for any style of climbing: stay in balance and conserve strength. Identify handholds for moving up and over the bulge. Make the most of footholds by keeping feet high and hips low to help press weight against the footholds (fig. 12-36). In some situations, it means pressing hips into the rock, with the back arched, to keep weight over feet while poised under an overhang.

To conserve strength, weight the feet as much as possible, even when negotiating a roof (fig. 12-37a). Keep arms straight while raising the feet (fig. 12-37b). Avoid hanging on bent arms, because this position will quickly exhaust arm strength. Push your body up with your legs rather than pulling with your arms (fig. 12-37c). Move quickly to minimize the time spent in these strenuous positions. Occasionally it may be necessary to rise up on the feet while making a dynamic reach to a handhold. Another trick is to throw one foot up onto a ledge while pushing with the other foot and pulling with the arms to swing up onto the top foot (fig. 12-37d).

Fig. 12-34. Liebacking combined with face holds.

Fig. 12-35. Climbing a dihedral using stemming and hand jams.

Fig. 12-36. Climbing an overhanging route: keep feet high and hips low.

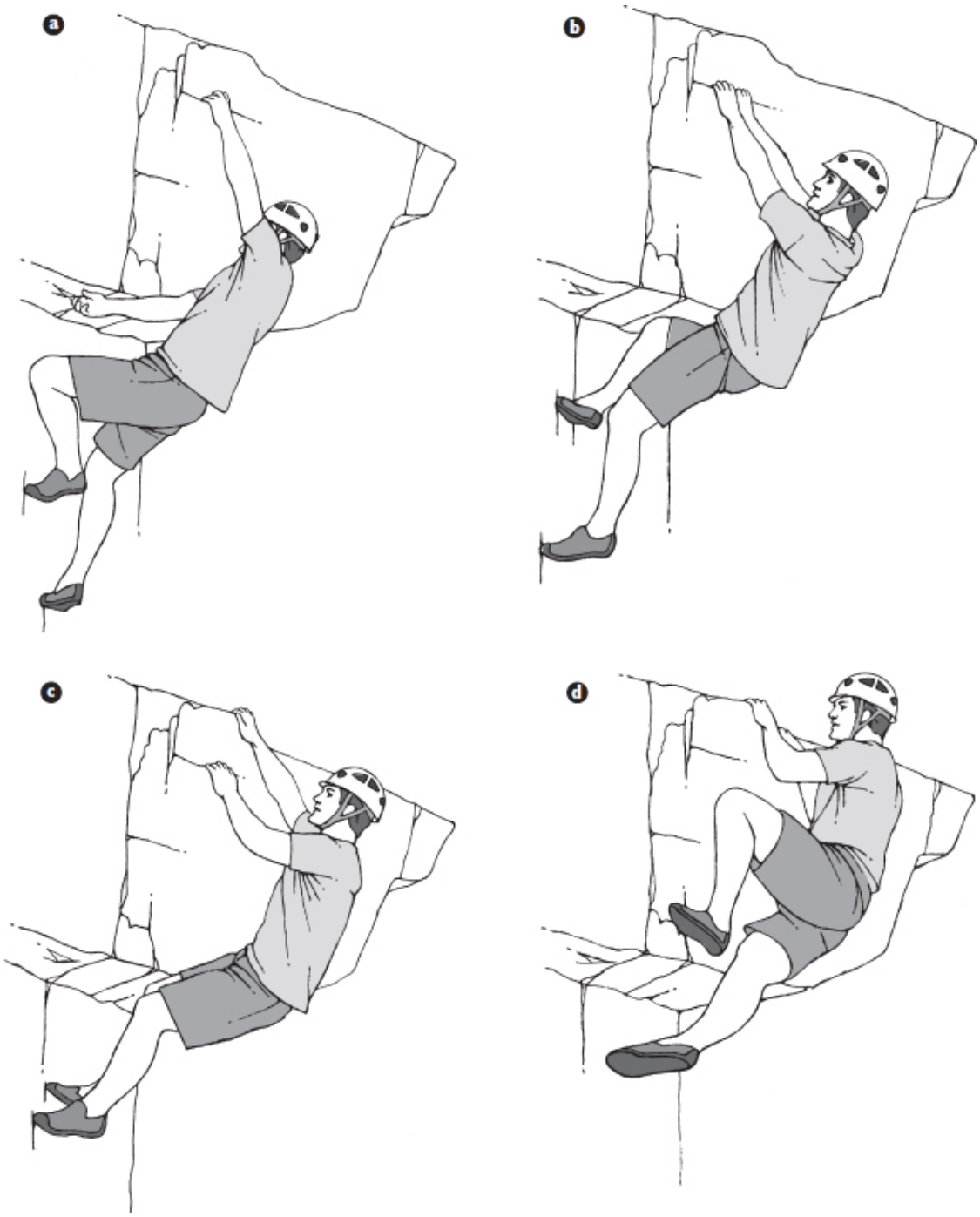

Fig. 12-37. Climbing over a roof: a, lean out with an outstretched arm to locate a hold above the roof, keeping hips close to the rock and feet weighted; b, move other hand up above roof, keeping arms straight; c, move feet up higher and push them against the rock; d, bring one foot up and begin to pull over the roof.

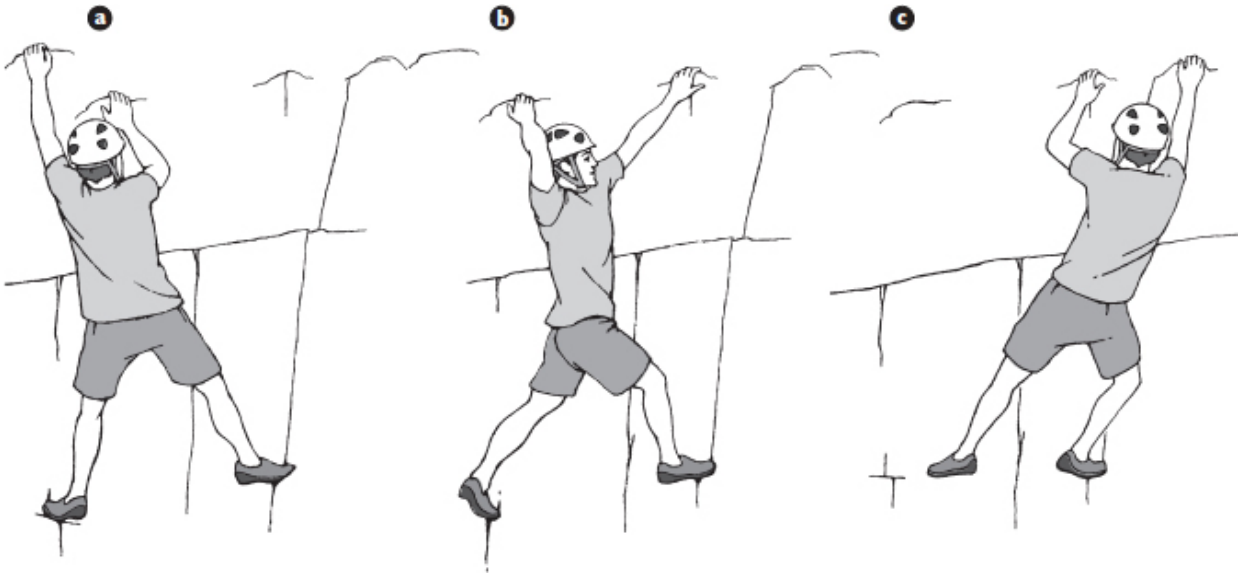

Fig. 12-38. Traversing a steep face (an advanced technique): a, start with right foot on a hold in the direction of the traverse; b, twisting the body, reach through with left hand and shift weight over right foot; c, move right hand to new hold, while shifting both feet to right.

TRAVERSING

Traversing—going sideways across a section of rock—calls for a wide variety of climbing techniques. The main ones are side-pulling, liebacking, and stemming. Good balance and being aware of your center of gravity are especially important during traverses.

Usually climbers face into the rock when traversing, their feet pointed away from each other (fig. 12-38a). Commonly climbers shuffle their hands and feet sideways, although it can be very useful to exchange one hand for the other (see "Placement Exchanges" above), or one foot for the other, on a single hold. Climbers may occasionally cross one foot behind the other or one hand over the other to reach the next hold (fig. 12-38b and c).

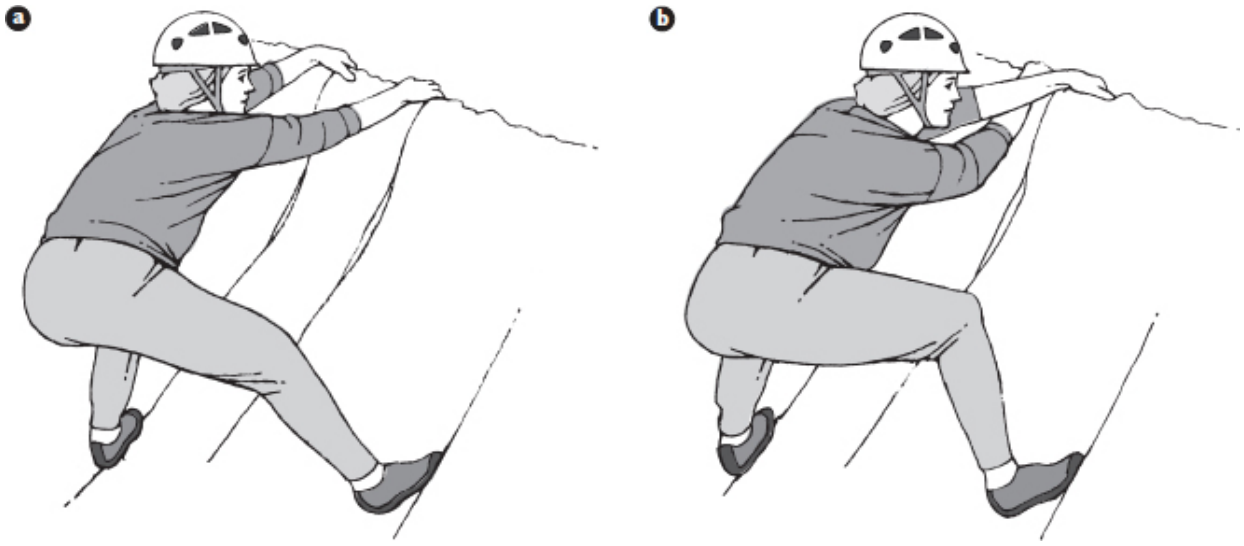

Fig. 12-39. Hand traverse: a, push feet against rock, providing counterforce; b, cross one hand over the other.

A hand traverse is necessary when footholds are marginal or nonexistent. The hands grip a series of holds or shuffle along an edge, while the feet provide a counterforce by pushing against the rock, as in a lieback or undercling (fig. 12-39a). Keep feet high and the center of gravity low so feet are pushed into the rock. Cross one hand over the other (fig. 12-39b). Again, keep arms straight to conserve arm strength and to let the legs do as much of the work as possible.

EXITING ONTO LEDGES

When approaching a ledge, continue to walk the feet up the rock, and then use down-pressure with hands near the edge of the ledge. A classic mantel (see Figure 12-14) is often an excellent exit move onto a ledge (fig. 12-40a). Avoid the temptation to simply lean forward and pull your torso onto the ledge; shifting your weight like that may throw you off balance and also make it impossible to keep an eye on the footholds (fig. 12-40b).

DOWN-CLIMBING

Efficient down-climbing is useful on many alpine climbs. Down-climbing is sometimes faster, safer, or easier than rappelling, and it may provide another retreat option when necessary.

Holds are harder to see when down-climbing than when climbing upward. The steeper the face, the harder the holds are to see. It is difficult to test holds

without committing to them. On low-angle rock, face outward for the best ability to see the route when down-climbing (fig. 12-41a). Keep hands low and use down-pressure holds whenever possible. Keep your weight over your feet to maximize friction, especially when going down slabs. It may help to keep your center of gravity low, with knees well bent (fig. 12-41b). As the rock steepens, turn sideways, leaning away from the rock for better ability to see the route (fig. 12-41c). If the angle gets even steeper, face into the rock and look down and around behind you (fig. 12-41d).

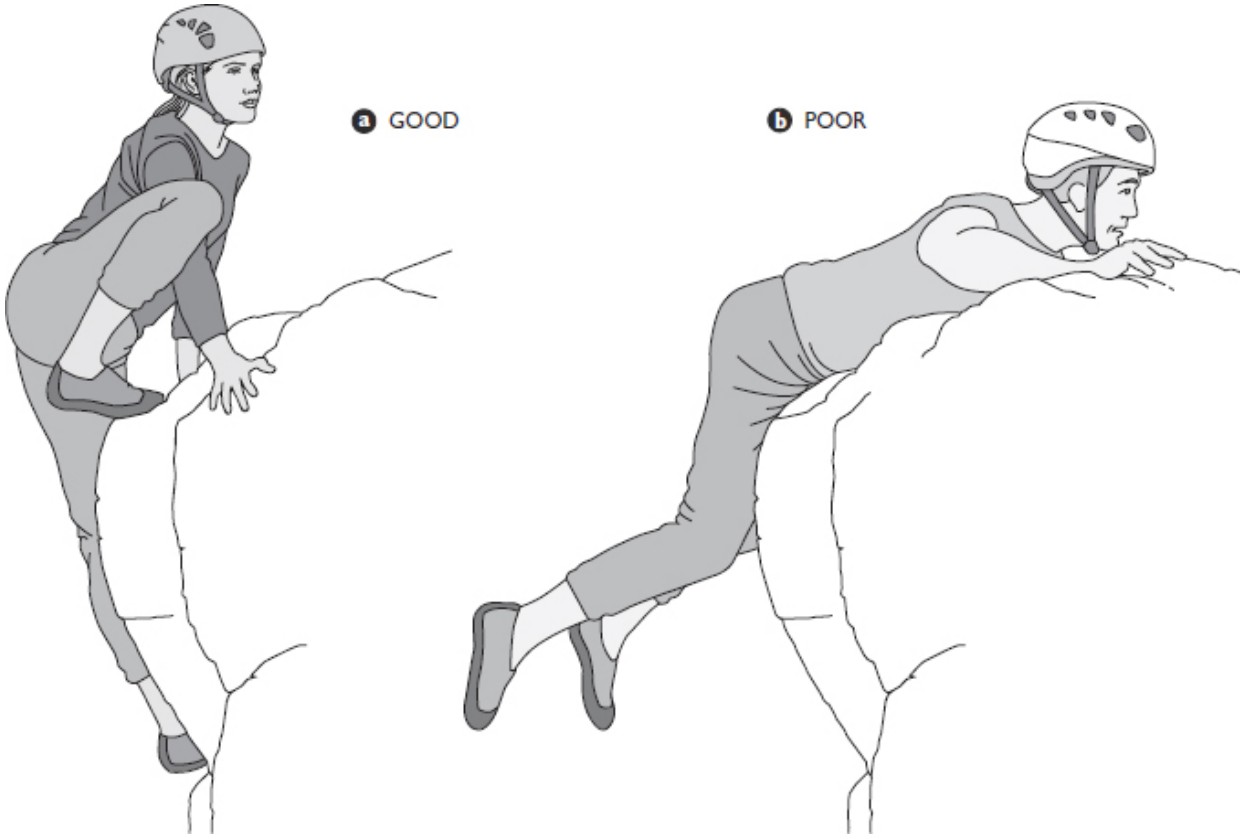

Fig. 12-40. Exiting onto a ledge: a, keep hands close to lip of ledge and mantel up (good); b, reaching too far forward with hands causes feet to lose their purchase (poor).

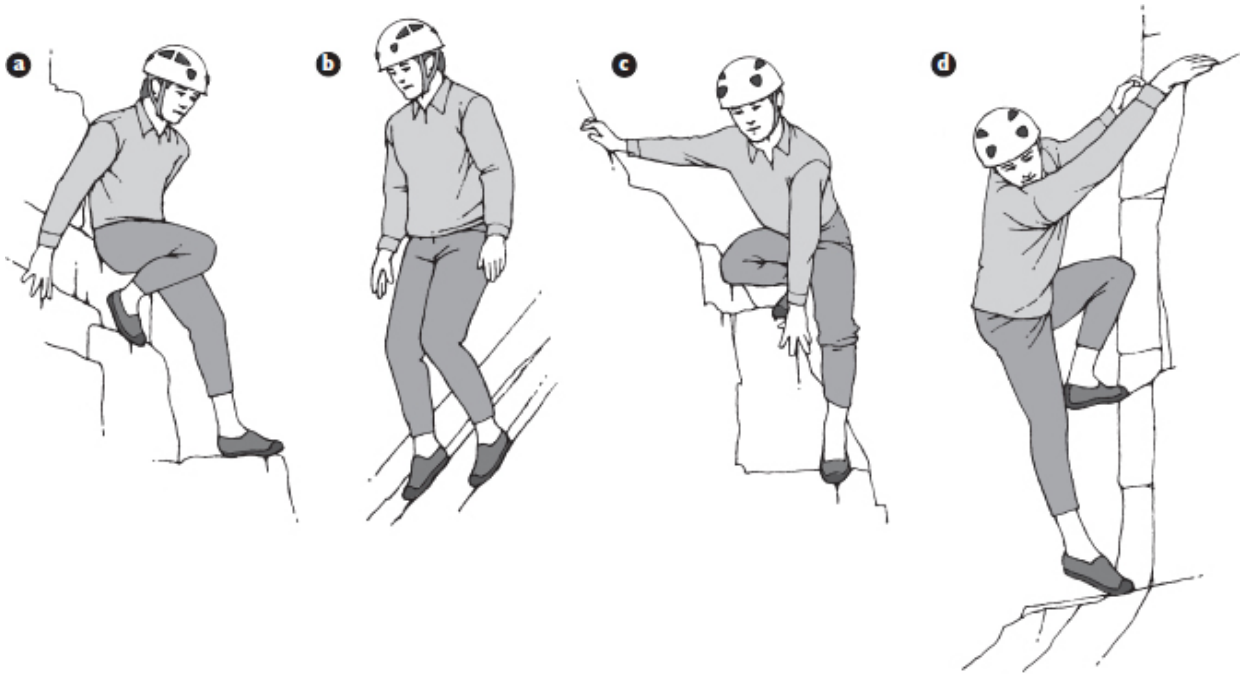

Fig. 12-41. Down-climbing techniques: a, facing out on low-angle rock; b, going down a friction slab; c, facing sideways on steeper rock; d, facing in on steep rock.

STYLE AND ETHICS

Climbers debate endlessly over which styles are fair and which are less than sporting and over which practices are harmful to the environment and which are not. Climbers soon discover that getting to the end of the pitch or the top of the peak is not the only goal—another is getting there in a way that feels right, respects the rock, and tests a climber's skill and resolve. These are matters of style and ethics.

The terms "style" and "ethics" are sometimes used interchangeably by climbers, but *style* is generally an individual attribute, while *ethics* pertains to overall application of the pursuit. In other words, style refers to each climber's personal mode of climbing; for example, is it fair to say you have led a first ascent if you first climbed the route on a top rope? Ethics pertain to issues concerning preservation of the rock and the environment itself.

DIVERSITY OF STYLES

Styles change and attitudes evolve, but the core of the debate on climbing styles is about how to maintain the challenge of climber against rock and how to play the game in a way that fairly tests the climber.

Climbers adhering to *traditional style* prefer to climb each route strictly from the ground up, with no help from such aids as top ropes or preplaced protection such as bolts. New routes are explored and protected only on lead. This type of climbing characterizes rock climbing in the alpine setting, but it is also found at many popular crags.

Climbers following the *sport-climbing style* influenced by Europeans are more likely to find other techniques acceptable as well. This can include inspecting the route on rappel before trying to lead it from below. It can also mean cleaning the route (removing protection placed by the lead climber or by another climber) and perhaps preplacing protection on rappel. Routes may be climbed with multiple falls, by resting on the rope while checking out the next move (*hangdogging*), or by rehearsing moves with the help of a top rope. These techniques have made it possible to climb harder and harder routes with the climber assuming less risk.

Often, due to the commitment and remoteness of alpine ascents, climbers will pull on gear or stand in a sling to climb through a hard section with greater speed and safety. Just as alpine climbers can improve their technique by cross training with sport climbing, they will also benefit from a knowledge of aid climbing (see Chapter 15, Aid and Big Wall Climbing).

A particular climbing area may lend itself more to one style than another because of the type of rock, the difficulty of the routes, or the prevailing style among the local climbers. In the world of climbing, there is room for a diversity of styles, and most climbers experience a variety of them.

ETHICS AND THE ROCK

The subject of ethics has to do with respecting the rock and every person's chance to use it. Unlike climbing style, ethics involves personal decisions that do affect others' experience and enjoyment. This includes the sticky question of the manner in which bolts are placed on a route. Are bolts that are placed on rappel different from—less "ethical" than—bolts placed on the lead? Some climbers may argue that bolts placed while on rappel rob others of the chance to try the route from the ground up, and such bolts are often placed at less-convenient places than they would be if they were placed on a ground-up ascent. But other climbers may say that placing the bolts on rappel gives them a chance at an otherwise unclimbable route.

Each area has its own tradition of what styles and ethics are acceptable. Visiting climbers should observe the local standards, which are usually

described in local guidebooks, as well as any land management regulations, since some areas prohibit any bolting or placing of permanent anchors. Sometimes locals may disagree among themselves. This book does not try to resolve issues of style and ethics, but there is general agreement on a couple of principles.

Preservation of the rock is paramount. Chipping the rock to create new holds is unacceptable and destroys a natural feature—and who knows? It may be climbed someday as it is. Although bolt-protected routes are common in many areas, bolting should not be indiscriminate. In the mountains or other wilderness areas, away from concentrated centers of rock climbing, it is particularly important to preserve the environment for those who follow. If possible, stick to clean climbing, using only removable gear for protection (see Chapter 13, Rock Protection).

It is almost never justifiable to add a bolt to an existing route (*retro-bolting*). If you feel you cannot safely climb the route as it is, do not try it. Retro-bolting usually occurs when a consensus of local climbers agree that more bolts should be placed to promote safety and enjoyment and the first ascensionists concur.

There should be no objection to replacement of an old bolt with a newer, stronger one at an established belay or rappel point, provided you have the necessary skills and experience to replace it.

COURTESY

Climbers should keep others in mind when they are out climbing. If a climbing party is moving up a multipitch route at a much slower pace than that of the people behind them, the first group should let the following party pass at a safe spot, such as a belay ledge. Passing can be awkward or dangerous on some longer, harder routes so a party traveling more slowly than the norm for such a route may leave many frustrated climbers waiting for several hours or having to retreat.

BEING PREPARED

Beware of tackling climbs that are beyond your personal abilities. Try climbs at your limit on the crags rather than in the mountains. If inexperience gets a climbing party in trouble in the mountains, they may involve other climbers in a time-consuming and dangerous rescue of their party. Come prepared to

handle the possibilities inherent in the chosen climb. Aim to be self-reliant within your climbing party and capable of self-rescue. This competence will add to climbers' confidence and enjoyment of the alpine environment.