between axes A and B is α, Preferably, the acute angle α is in the range of about 3 degrees to about 30 degrees, more preferably in the range of about 10 degrees to about 25 degrees or about 15 degrees to about 30 degrees, and even more preferably in the range of about 15 degrees to about 25 degrees. An angle α of about 20 degrees is most preferred. Tip **32** is offset laterally from the proximal end **38** of distal portion **16** by an offset distance C. Distance C is preferably at least about 1 mm and less than about 5 mm, and more preferably about 2 mm to about 3 mm.

The distal end **36** of sheath **34** is fitted over and secured to the proximal end **38** of tube **30**, such as by adhesive. Disposed within distal portion **16** and sheath **31** of light guide **14** and extending therethrough is a central imaging optical fiber bundle **22** surrounded by an illumination optical fiber bundle **26**, the purposes of which were described above.

Main portion **31** and distal portion **16** preferably are constructed of dissimilar materials, the sheath **34** preferably comprising a polymeric material and the tube **30** preferably comprising a metal material. Alternatively, sheath **34** and tube **30** can be comprised of substantially similar materials, i.e., polymeric materials, while having different flexibilities. For example, sheath **34** and tube **30** could be constructed integrally of the same polymeric material, with the difference in flexibility being provided by differences in wall thickness or special treatment of the material comprising distal portion **16** to increase its stiffness relative to main portion **31**. As another alternative, the stiffness of distal portion **16** could be increased by way of an internal sleeve fitted therein to provide the desired angle.

Main portion **31**, comprised of sheath **34** and fiber optic bundles **22** and **26** disposed therein, is flexible and elastic and of relatively low stiffness or rigidity. Main portion **31** is bendable between a relaxed configuration and a strained configuration. Even if bent to a strained configuration in which the radius of curvature is less than about two inches, main portion **31** preferably will rebound elastically substantially to the relaxed configuration. Main portion **31** preferably will not incur a substantial permanent deformation when bent to the strained configuration. In the relaxed configuration, the radius of curvature is preferably at least about 4 inches, and more preferably main portion **31** is substantially straight.

Main portion **31** of light guide **14** is flexible as demonstrated by the relatively small radius to which it can be bent or curved, and elastic as demonstrated by the rebound differential in radius of curvature between the strained configuration and the relaxed configuration. Main portion **31** has a flexural rigidity, defined as the product of its moment of inertia, I, and its tension modulus of elasticity, E. The flexural rigidity, IE, is relatively low. In contrast, the distal portion **16** is relatively stiff, or rigid, to substantially maintain the pre-formed angular bend under the forces normally encountered during use of the viewing assembly **10**. The flexural rigidity of distal portion **16** is relatively large.

The flexibility, elasticity, and relatively low rigidity of main portion **31** works in concert with rigidly pre-curved or offset distal portion **16** to provide particular advantages and improved performance over prior art endoscopes for use in the field of endotracheal intubation. For example, the flexibility and relatively low stiffness, or low flexural rigidity, of main portion **31** provides for the endoscope to be pushed through an emplaced breathing tube and traverse bends of relatively small radii. The elasticity of light guide **14** provides that light guide **14** will spring back after traversing a bend, preferably at least about halfway to the relaxed orientation. More preferably, the light guide **14** will not acquire a substantial permanent set or deformation. This is advantageous if the endoscope must traverse a subsequent bend of opposite direction, and if the endoscope is to be reused with another patient after being sterilized.

The distal portion **16** is advantageously pre-bent or pre-curved through an acute angle α in the range of 3 to 30 degrees, most preferably about 20 degrees, and is sufficiently stiff or flexurally rigid to substantially maintain the preselected acute angle. This provides the advantage of an endoscope in which the angle of view is preferably at an acute angle relative to the principal longitudinal axis of the endoscope, thereby affording a wider field of view as the endoscope is rotated through 360 degrees about its longitudinal axis. The pre-curved distal portion **16** also allows the light guide **14** to more easily follow the curvature of the endotracheal breathing tube. This can be accomplished by rotating the endoscope so that the distal portion **16** is curved in the direction of curvature of the breathing tube prior to advancing the lightguide **14** through the breathing tube. Yet another advantage of the pre-curved or bent distal portion **16** is that the terminus of the light guide **14** can be kept from scraping along the inner wall of the breathing tube by steering the endoscope as described above for traversing bends in the breathing tube. The pre-curved distal portion **16** provides for the distal tip **32** to be laterally offset from main portion **31**. This offset can be used to advantage to alleviate the problem of the distal end scraping up deposits on the inner wall of the breathing tube by keeping the distal tip **32** substantially displaced from the inner wall as the light guide **14** is advanced through the breathing tube. Without the offset, such deposits might collect on the objective end of light guide **14** and obscure or distort the view through the imaging fiber optic bundle.

Proximal body **12** and first and second optical ports **18** and **20**, as well as associated viewing optics, light source and handle are described in U.S. Pat. No. 5,951,463, to Lombardi et al., which description is hereby incorporated by reference. The preferred embodiment of viewing assembly **10** differs from that illustrated and described in the above-referenced patent with respect to the configuration and characteristics of the light guide **14** and distal portion **16**, which were described in detail above.

FIG. **5** shows the viewing assembly **10** in combination with handle and light source **50** and viewing optics **52**, both of which are described in U.S. Pat. No. 5,951,463, incorporated by reference.

Although the present invention has been described in detail in terms of a preferred embodiment, no limitation on the scope of the invention is intended.

We claim:

1. An elongate viewing assembly for use as part of an endoscope, comprising:

a) a flexible main portion bendable between a relaxed configuration and a strained configuration as the viewing assembly is guided through a lumen and carrying an imaging optical fiber and an illumination optical fiber; and

b) a substantially fixedly rigid distal portion connected to the main portion and having a pre-curved rest orientation and a distal end that is offset laterally from the main portion.

2. The viewing assembly of claim **1**, wherein the distal portion is substantially rigid.

3. The viewing assembly of claim **1**, wherein the offset of the distal end is in the range of about 1 millimeter to about 5 millimeters.