We claim:

1. A downhole tool, conveyable downhole along the axis of a well casing, the downhole tool comprising:

a setting tool ~~having~~ comprising an axial actuator ~~and~~

an expansion element having a first diameter in an uncompressed position for conveyance along the well casing, the expansion element being compressible axially by the axial actuator for expanding radially to a second diameter in a compressed position for plastic deformation of the well casing;

a tubular body defining a bore axially therethrough and comprising a plurality of cylinders, the bore extending through the cylinders, wherein the axial actuator comprises a plurality of axially stacked piston modules, each comprising: a respective one of the cylinders and a respective piston axially drivable within the bore relative to the respective cylinder;

a mandrel, wherein the expansion element is mounted on the mandrel, and the mandrel is axially drivable by the pistons for axially compressing the expansion element.

2. The tool of claim 1, wherein the ~~setting tool further comprises a~~ tubular body ~~having a bore~~includes, an outer sleeve, the outer sleeve comprising the cylinders of the stacked piston modules ~~and an axial actuator operable axially in the bore, the axial actuator connected to a mandrel drivable axially with respect to the outer sleeve,~~ and wherein the outer sleeve ~~forming~~ forms a first stop and the mandrel ~~supporting~~ supports a second stop, the expansion element being mounted over the mandrel intermediate the first and second stops, the axial actuator operable to drive the mandrel and the second stop relative to the first stop to compress the expansion element ~~sandwiched~~ therebetween.

3. The tool of claim 2, wherein the outer sleeve has an ~~up hole~~uphole end adapted for conveyance and a downhole end forming the first stop, the mandrel extending telescopically from the downhole end.

4. The tool of claim 1, 2 or 3, wherein the expansion element ~~is~~ comprises a stack of pleated rings.

5. The tool of claim 4, wherein in the ~~released~~ uncompressed position, the stack of pleated rings ~~have~~ has a first diameter less than that of the well casing and when in the compressed position, the stack of pleated rings has a second diameter adapted to engage the well casing.

6. The tool of claim 1, 2 or 3, wherein the expansion element ~~is~~ comprises an elastomeric bushing.

~~7. The tool of any of claims 1 to 6, wherein the axial actuator comprises one or more pistons housed within the outer sleeve, the one or more pistons connected to the mandrel.~~

~~8~~7. The tool of claim ~~7~~1, wherein the ~~setting tool's~~ tubular body is conveyed by electrical wireline, the axial actuator further comprising:

an electric motor within the tubular body and connected through the wireline with a source of electric power at surface; and

a hydraulic pump within said tubular body and having a source of hydraulic fluid and a fluid output, the pump being drivable coupled to the motor, the fluid output being fluidly connected to the ~~one or more~~ pistons.

~~9~~8. The tool of claim ~~5~~2, wherein,

the expansion element comprises a stack of pleated rings,

in the uncompressed position, the stack of pleated rings has a first diameter less than that of the well casing and when in the compressed position, the stack of pleated rings has a second diameter adapted to engage the well casing, and

the stack of pleated rings ~~is~~ comprises a plurality of wave spring rings separated and spaced apart by annular washers and slidably mounted about the mandrel between the first and second stops, each pleated ring having axially undulating peaks and valleys and, when compressed between the first and second stops, the peaks of each pleated ring flatten against the washers and the second diameter increases to engage and plastically expand the well casing.

~~10~~9. The tool of claim ~~9~~8, wherein the stack of pleated rings further comprises a viscous fluid in ~~the~~ interstices between peaks of the pleated rings, and when the stack of pleated rings is actuated to the compressed position, the viscous fluid seals between adjacent washers, the mandrel, the adjacent pleated rings and the well casing when for further applying fluid pressure to the well casing.

~~11~~10. A method for ~~insitu expansion of~~ remediation of a well including a wellbore, a well casing positioned in the wellbore, and an annular space between the well casing and the wellbore, and having a cemented sheath in the annular space about the well casing, the method comprising:

conveying an expansion element downhole on a conveyance string to a ~~specified location~~ first location along the well casing, the expansion element being mounted over and extending circumferentially about a mandrel of the conveyance string, and wherein the expansion element is axially compressible for radial expansion;

actuating the expansion element radially outwards, by axial compression of the expansion element, to plastically expand the well casing circumferentially at the ~~specified~~ first location, thereby compressing the cement sheath within the annular space at the first location to remediate the cement sheath at the first location~~; and~~

~~releasing the expansion element~~.

~~12~~11. The method of claim ~~11~~10, ~~wherein the element is single use and the releasing of the expansion element is to release~~further comprising releasing the expansion element, thus radially expanded, from the conveyance string for abandonment in the well casing.

~~13~~12. The method of claim ~~11 or 12~~ 10, ~~wherein the element is multi-use and the releasing of the expansion element comprises~~further comprising contracting the expansion element radially inwards from the ~~expanded~~ well casing, thus expanded, to allow axial movement of the expansion element within the well casing.

~~14~~13. The method of claim ~~13~~12, ~~wherein after releasing the expansion element further comprising moving the conveyance string along the casing to a successive specified location and repeating the actuating and element-releasing steps~~ further comprising:

conveying the expansion element to a second location along the well casing; and

actuating the expansion element radially outwards to plastically expand the well casing at the second location.

~~15. The method of claim 14, wherein the element has a Poisson's Ratio, the actuation step comprises axially compressing the element along the casing for expanding the element radially.~~

~~16~~14. The method of claim ~~15~~10, wherein the expanding of the expansion element radially is irreversible.

~~17~~15. The method of claim ~~15~~ 10, wherein the expanding of the expansion element radially is reversible.

~~18. The method of claim 11, wherein the well casing has a cement sheath thereabout, the actuating of the element to plastically expand the casing at the specified location further comprises compressing the cement sheath to compact the cement.~~

~~19~~16. The method of claim ~~13~~10, ~~wherein the well casing comprises jointed casing, each joint of casing having a weld seam, and after releasing the expansion element, further comprising moving the conveyance string along the casing to a successive specified location in a successive jointed casing and repeating the actuating and element-releasing steps~~further comprising:

radially contracting the expansion element inwards from the well casing at the second location;

conveying the expansion element to at least one further location along the well casing; and

for each at least one further location, actuating the expansion element radially outwards to plastically expand the well casing at the respective further location and then radially contracting the expansion element.

~~20. The method of claim 19, further comprising repeating the moving of the conveyance string along the casing to a successive specified location in a successive jointed casing and repeating the actuating and element-releasing steps for two or more repetitions.~~

~~21~~17. The method of claim ~~11~~10, ~~herein the expansion of well casing comprises remediation of an abandoned well completed with casing and having a cemented sheath thereabout at least a portion thereof,~~ wherein, prior to the step of actuating the expansion element radially outwards to plastically expand the well casing, the well exhibit~~ing~~ surface casing vent flow ~~originating at or below a specific location~~.

18. A method for remediation of a well including a wellbore, a well casing positioned in the wellbore, and an annular space between the well casing and the

wellbore, and having a cemented sheath in the annular space about the well casing, the method comprising:

conveying an expansion element downhole on a conveyance string to a location along the well casing, the expansion element comprising an elastomeric cylindrical ring mounted over and extending circumferentially about a mandrel of the conveyance string, and wherein the elastomeric cylindrical ring is axially compressible for radial expansion;

axially compressing the elastomeric cylindrical ring, the axial compression causing radial expansion of the elastomeric cylindrical ring to plastically expand the well casing circumferentially at the first location, thereby compressing the cement sheath within the annular space at the first location to remediate the cement sheath at the first location.

19. The method of claim 18, wherein the outer diameter of the well casing is expanded by 3/16 of an inch to 1.6 inches at the location for compressing the cement sheath at the location.

20. The method of claim 18 or 19, further comprising axially decompressing the elastomeric cylindrical ring, thereby radially contracting the elastomeric cylindrical ring inwards from the well casing, thus expanded, to allow axial movement of the elastomeric cylindrical ring within the well casing.

21. The method of claim 20, further comprising:

conveying the expansion element to a second location along the well casing; and

actuating the expansion element radially outwards to plastically expand the well casing at the second location.