

repetition frequency is controlled by accumulation of fluid whether also used for sample propulsion or not. It will be apparent that control of duration of sampling, instead of repetition frequency, can be accomplished by disjoining conduit 13e (in the arrangement of FIG. 3 or FIG. 4) from ancillary conduit 13 and joining it to auxiliary conduit 15 near secondary surge tank 14. The secondary surge tank itself may be omitted in any case when the volume of conduit 15 and connected lines is substantial.

Effective sampling is a prerequisite to analysis and/or treatment of the medium in question, such as for pollution control. Good regulation of sampling frequency is required in the formation of composite samples. The apparatus of this invention permits a wide range of sampling frequency with accurate and ready regulation thereof. The depth-proportional feature permits great improvement in the representative character of such samples, especially in periods of fluctuating depth of the liquid being sampled, such as a natural stream during temporary flooding.

Whereas a particular apparatus embodiment of depth device has been described, together with several particular embodiments of pressurized fluid-operated samplers, it will be understood that variations may be made therein, as in the interest of manufacturing economy. Thus, where other calibration methods are available, one or more of the valves utilized in the described preferred method may be omitted. Also, provision of constant-pressure sources of pressurized fluid can replace constant-pressure regulation at sampler input and even permit similar elimination of such regulation at the input to the depth device, at least where switching pressure on/off differential lies within sufficiently close limits. Other modifications also may be made in the depth device and in arrangements of sampling apparatus in conjunction with which it is used, as by addition, combination, or division of parts or steps, or by substitution of equivalents therefor, while retaining at least some of the advantages and benefits of the invention, which itself is defined in the following claims.

The claimed invention is:

1. In sampling of liquid from a body thereof at a given locus therein to a collection location, utilizing accumulation of fluid to determine sampling frequency, the improvement comprising bleeding off fluid from such accumulation against back pressure of the body of liquid at the sampling locus therein and thereby relating the quantity of liquid collected to the depth at the sampling locus.

2. Liquid sampling according to claim 1, including proportioning the quantity of liquid collected by repeated sampling to the liquid depth at the sampling locus.

3. Liquid sampling according to claim 1, wherein the body of liquid is flowing, and including proportioning the quantity of liquid collected by repeated sampling to the liquid flow past the sampling locus.

4. Process of depth-proportional sampling of liquid from a body thereof at a given locus therein by accumulation of fluid for propulsion thereof to a collection location, characterized by the steps of propelling samples of the liquid with the fluid at intervals and bleeding off fluid from such accumulation against back pressure

of the body of liquid at the depth of the sampling locus therein.

5. Liquid sampling according to claim 4, including the step of triggering sample propulsion at a certain pressure of accumulated fluid and thereby controlling the sampling repetition frequency.

6. Liquid sampling according to claim 4, wherein the fluid is bled off substantially continuously and is bubbled through the liquid at such depth, including the step of adjusting the bleed-off rate at zero depth of liquid to equal the rate of fluid accumulation.

7. Flow-proportional sampling of liquid to a collection location from a body thereof flowing past a given locus therein, comprising accumulating fluid at increasing pressure from a source thereof, bleeding off fluid substantially continuously from the accumulation thereof at a rate lower than the rate of accumulation, conducting such bled-off fluid to and releasing it against the liquid back pressure at the sampling locus, and thereby regulating the quantity of liquid so propelled and collected in accordance with the flow of liquid past the sampling locus.

8. Liquid sampling according to claim 7, including the step of triggering sample propulsion repeatedly whenever the accumulated fluid pressure reaches a certain value.

9. Liquid sampling according to claim 7, including the step of proportioning the sampling repetition frequency to the liquid flow past the sampling locus.

10. Process of liquid sampling comprising supplying fluid at given pressure continuously from a source thereof, accumulating such fluid at a given location at a regulated rate and at pressure gradually increasing toward the given supply pressure, continuously bleeding off part of the accumulating fluid against back pressure of the liquid to be sampled as determined by the depth thereof at a sampling locus therein, the bleed-off rate at zero depth of liquid equalling the rate of fluid accumulation, establishing, whenever a certain accumulated fluid pressure is reached, an interconnection from the fluid source to the sampling locus and thereby propelling samples of liquids therefrom.

11. Apparatus for sampling liquid, comprising a source of fluid at superatmospheric pressure, valve means regulating flow of fluid from the source to a locus of accumulation thereof, means interconnecting the locus of fluid accumulation to the liquid to be sampled to bleed fluid off against back pressure of the liquid, and means separately interconnected to such locus and responsive to the pressure of such fluid accumulation for effecting sampling of the liquid when-ever a certain pressure thereof is reached.

12. Liquid-sampling apparatus according to claim 11, wherein the bleed-off means includes adjustable valve means and a bubbler tube immersed in the liquid to the sampling depth.

13. Liquid-sampling apparatus according to claim 11, including a surge tank at the locus of fluid accumulation, wherein the last means is adapted to interconnect the surge tank intermittently to the liquid to be sampled whenever the certain pressure is reached.

14. Liquid-sampling apparatus according to claim 11, wherein the last named means is adapted to interconnect the fluid source intermittently to the liquid to be sampled whenever the certain pressure is reached.