certain that the only direct action of the pituitary on metamorphosis is its contribution of thyrotrophic hormone. Participation of the gluco-corticoids in amphibian metamorphosis may be rationalized on the basis of the adrenals' recognized role in protein metabolism. Both the thyroid and the adrenal cortex have been implicated in the mobilization of protein reservoirs (*1*). It is anticipated that tail resorption, limb development, and other morphological changes during metamorphosis will be preceded by intense protein mobilization.

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Method for the Chromatographic Separation of Very Polar Steroids

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In this paper we present a method for the separation by paper partition chromatography of very polar steroids as exemplified by cortisone (E), hydrocortisone (F), and their tetrahydro and dihydro derivatives (*1*).

All the methods published to date (*2*) have limitations when rapid separation of such steroids at room temperature is required. A chromatographic method of our own (*3*) used for the separation of hydrocortisone, cortisone, and less polar steroid was adapted to the rapid separation at room temperature of very polar steroids by prior impregnation of the filter paper with water or the saturated aqueous phase of the solvent mixture. The method was extended to include a number of different solvent systems. Some 70 solvent mixtures were investigated. The ones reported here have been in use in our laboratory for the past year and give good separations of the very polar steriods.

The solvent systems under consideration contain water in the organic phase which is used as the developing solvent. One-inch strips of Whatman No. 1 filter paper with 1-cm wicks were impregnated thoroughly with the saturated aqueous phase for 15 min in closed vessels. Excess solvent was removed by pressing firmly between sheets of filter paper. The steroids were applied in an area not more than 1 cm in diameter. The strips were suspended in vessels in which the atmosphere had been thoroughly saturated with the solvent mixture. One-half to one hour later the developing solvent was added and the chromatogram was run in descending fashion. Table 1 gives the mobilities of the pure steroids relative to that of cortisone.

Table 1. Mobilities of steroids relative to that of cortisone.

Compound	Solvent systems*					
	1	2	3	4	5	6
Pregnane 3β, 5β, 14β, 19, 21 pentol 20—one	0.00	0.06	0.02	0.10	0.03	0.23
Tetrahydro F	.34	.29	.20	.43	.31	.35
Tetrahydro E	.67	.67	.47	.62	.49	.55
Dihydro E	.68	.72	.48	.67	.50	.58
Hydrocortisone	.50	.39	.43	.68	.62	.62
Aldosterone	.58					
Cortisone	1.00	1.00	1.00	1.00	1.00	1.00

* Composition of the solvent systems: (1) 200 ml toluene, 100 ml petroleum ether, 15 ml butanol, 15 ml ethanol, 70 ml water. (2) 100 ml toluene, 200 ml petroleum ether, 12 ml butanol, 12 ml ethanol, 80 ml water. (3) 200 ml toluene, 100 ml petroleum ether, 100 ml ethanol, 100 ml water. (4) 150 ml benzene, 400 ml ethanol, 200 ml water. (5) 200 ml benzene, 10 ml ethyl acetate, 50 ml water. (6) 150 ml toluene, 400 ml ethanol, 200 ml water.

In all of these solvent systems the $C_{21}O_5$ steroids move faster than the $C_{21}O_6$. For the $C_{21}O_5$ series, tetrahydro E and dihydro E move faster than hydrocortisone in solvent systems 1, 2, and 3, whereas in solvent systems 4, 5, and 6, tetrahydro E and dihydro E move more slowly than hydrocortisone. The use of solvent systems in which the relative mobilities of steroids can be sufficiently altered so that tetrahydro E and dihydro E can be made in one instance to move between cortisone and hydrocortisone and in another instance between the origin and hydrocortisone, depending on the composition of the solvent system, is of importance in the validation of the method of identification of unknown steroids by mixed chromatograms with known steroids.

In system 1, crystalline aldosterone is readily separated from cortisone and hydrocortisone. The salt-retaining material from human urine (*4*) has the same mobility in this solvent system as the aldosterone prepared from bovine adrenal glands.

Further application of this method to other steroids and cardiac aglycones is in progress.

References and Notes

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Communications

On the Legitimacy of Scientific Authorship

A recent communication [J. Wilson, *Science* 120, 276 (1954)] inveighs against competitive publication. While one agrees wholeheartedly that "the accent must be on the desire to pass along what has been discovered," the extreme form of argument invites certain criticisms.

1) Does employment or promotion really depend on the *number* of publications? Such a claim appears to be a gratuitous attack upon the discrimination of scientists responsible for personnel selection in universities and research institutions. Surely quality is usually considered the most useful criterion of ability. And a paper under one name will be given the greatest weight as evidence of individual worth.

2) Some people are said to put down what everyone knows, and because no one has written it up they get the credit. One may doubt that unpublished studies can be generally known. But, granting failure of the original investigator to publish, it might be argued that he who makes the work public performs a service useful to science. If a man is paid to carry on research (as are most of us now), his duty should be to make the results known, or allow others to do so.

3) Remarks about material that has no business in print seem to imply a widespread failure of editorial function, and perhaps a trace of intellectual snobbery. A young scientist may rely on expert and impartial editorial criticism to develop his standards. Moreover, strictures on third-rate papers have been known to serve as excuse for publishing nothing. Who waits to produce a classic may wait forever, while the second or even fifth-rate scientist makes many useful contributions in his humbler sphere.

4) By omitting names from articles, a helpful guide to quality and reliability is lost.

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Eville Gorham's communication came to us originally as a letter expressing private views; but at our instance, he agreed to put it into a form suitable for publication.

"Whether scientists like it or not, the competitive spirit is now being applied to science no less than to business or industry" writes John Wilson [*Science* 120, 276 (1954)]. Wilson deplores also the printing of one's name as author of a paper when most of the meat of that article did not originate with the author and asks if there is, among scientists, a mad scramble to get their names in print.

On staffs of institutions where research is the sole or principal function, there may be the scramble that Wilson mentions but it seems to me that he is, in a large measure, incorrect when he frames his picture, as he does, to include scientists in universities. Those individuals have the dual responsibility of teaching and research.

In a university, assistant professors, who prove to be capable teachers although ineffective in research and publication, find out, to quote Wilson, that "either we get papers out or get out." These teachers will probably find their niches in colleges because many colleges make teaching alone the principal responsibility of professors.

Other assistant professors who prove to be highly effective in research and productive in published writing, but ineffective in teaching, also will have to get out and probably will find their niches in organizations with research as their principal function.

There is also the assistant professor who proves to be effective in both teaching and research. Furthermore, the results of his research are worthy of publication and therefore are published. He probably will find his niche in a university and in time will earn promotions up to and including the rank of professor. If so, he repeatedly will have expounded information that mostly is not the result of his own researches. He will have done this in three ways: (i) verbally in lectures, (ii) by demonstrations in the laboratory, and (iii) by publication of articles aimed to inform the elders and parents of his students. He signs his name to articles as a scrivener rather than as a discoverer. The elders pay his salary, in part, for his interpreting science for them. They read his material when few or none would do so if it were anonymous. In fine, the professor publishes results of his research and also interpretations of research.

The university professors that I know "do the best they can" and seem to be unworried by the competi-